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Services for People Innovation Park – Planning Methodologies

Maria Angela Campelo de Melo¹, Lygia Alessandra Magalhães Magacho²

Abstract

This article aims to identify appropriate methodologies for the planning of a Services for People Innovation Park-SPIP, designed according to the model proposed by the Ibero-American Network launched by La Salle University of Madrid. Projected to form a network, these parks were conceived to provoke social change in their region, improving quality of life and social welfare, through knowledge, technology and innovation transfer and creation of companies focused on developing product and services to reduce social inequalities. Building a conceptual framework for the identification of planning methodologies compatible with the SPIP problematique, this article analyses the theories of complex systems and adaptive planning, considering the particularities presented by Innovation Parks. The study deepens the understanding of the problems inherent in park planning, identifies the key issues to be considered during this process, and characterizes the SPIP as active adaptive complex system, suggesting methodologies more appropriate to its planning.

Keywords: services for people innovation park-spip; ibero-american network; complex systems; adaptive planning; innovation parks; innovatory planning; active adaptive complex systems.

Introduction

The aim in this article is to identify appropriate methodologies for the planning of a Services for People Innovation Park-SPIP, according to a model proposed by the Ibero-American SPIP Network, launched by Madrid's La Salle University in November 2008 in Lima, Peru (SIPISP, 2008). The participation of the Pontifical Catholic University of Rio de Janeiro in this Network motivated the development of the study by Magacho (2010) on which this article is based.

Based on a set of principles and values, with special emphasis on the fostering of sustainable local human development, the Network encourages inter-university cooperation for the promotion and implementation of local and regional development models. It thus supports the new concept of university which, in addition to its traditional functions of generating, transmitting and applying knowledge, is also engaged in a quest for innovation and entrepreneurship. With this objective, it proposes the creation of the SPIP in association with enterprises and regional and local governments, according to the Triple Helix model.

The SPIPs aim at provoking social change in their regions by improving quality of life and social welfare through the transfer of knowledge, technology and innovation, with the creation of enterprises which develop products and services to reduce social inequalities. They introduce citizenship as an agent to complement the Triple Helix components, - government, university and enterprises -, incorporating the perceptions and participation of the community into their processes.

The SPIPs, which are to be set up in highly unstable and impoverished environments, represent an innovative response by reconciling development and social inclusion. They involve a large number of actors, thus making their planning process more complex than that of traditional parks.

This article describes the SPIPs and identifies the most appropriate methodologies for their planning, given the high degree of complexity that distinguishes them from other ventures. Based on theories of complex systems and adaptive planning, it considers the specific characteristics of innovation parks and deepens the understanding of their planning, advocating that actions undertaken in the inter-organizational domain, the articulating role of these systems and the complex dynamics of technological development are absolutely fundamental in this process.

The parks are presented as a complex, active and adaptive system, highlighting actor heterogeneity, capability development and infrastructure requirements, technological and business flows and plurality of organizations.

This article begins with the presentation of the Services for People Innovation Parks-SPIP, based on the Ibero-American SPIP Network configuration proposed by Madrid's La Salle University. This is followed by a discussion of planning processes for innovation parks, comprising the properties of the planning process for complex systems, the adaptive planning methodologies and the characterization of the SPIP as a complex systems, in order to identify the most appropriate methodologies for the planning of these parks.

Services for People Innovation Parks-SPIP

The SPIPs, as components of the Ibero-American Network, are based on the same principles and values that govern this network, which can be summarized as follows: prioritize activities that improve the quality of life and develop people's capacities; foster sustainable local human development through innovative actions and projects; contribute to the construction of democratic values; respect each of its members and their respective ideologies, the authorship of their ideas and their academic and social work; be loyal to people, observing commitments assumed; and share knowledge to achieve common objectives more effectively.

The Network's overriding objective is to promote and implement innovative models of local and regional development and create SPIPs, through inter-university cooperation, in association with regional and local governments and enterprises. Its specific objectives are (SIPISP, 2008):

- Dynamize the SPIP creation process in universities that belong to the network.
- Favor the development of projects to improve the quality of life in the Ibero-American region, catering to the most urgent needs of people in each territory.
- Strengthen collaboration between the public sector, enterprises and universities.
- Boost the creation of innovative enterprises in the Ibero-American region.
- Support the development of the new concept of university which, in addition to its traditional functions of teaching (knowledge transmission), research (knowledge generation) and extension (knowledge application), is also engaged in stimulating innovation and entrepreneurship.

The basic Network services proposal contemplates the creation of a Local and Regional Innovation and Development Observatory, horizontal technical assistance (technical cooperation between network members), the holding of seminars and courses and support for resource management.

A panel of international specialists selected the founding members the Network among the institutions that participated in the seminar held in Lima that launched the SPIPs.

This group is composed of nine institutions from Brazil, Chile, Colombia, Ecuador, Mexico and Peru.

Representatives of these institutions attended a Training Course for Directors, held in Madrid in June 2009, during which the SPIP model was presented and where the lines of work for joint action and the implementation of the parks were defined. This course synthesized the Network's fundamental concepts which are: the new role of universities in cooperation for development; innovation and development; the SPIPs as instruments for local and regional development and as agents of Ibero-American cooperation; the Triple Helix; network-based cooperation.

The Model: Services for People Innovation Park

The PISPs, according to the Network's Charter (SIPISP, 2008), are non-profit institutions set up by universities to respond in an innovative fashion to people's needs and the problems of local and regional development. They are born as stable organisms, with the universities' permanent social commitment to development and are constituted in partnership with enterprises and governments, reflecting the interest and shared responsibility in finding new and more efficient responses to the problems of development. These parks introduce citizenship as a fourth agent, acting as a complement to the three traditional members of the Triple Helix, aiming at assuring the fulfillment of the purposes for which they were created, by recording the perceptions and participation of citizens in park activities and processes (SIPISP, 2008).

The SPIP's main mission, declared in its Charter, is to transfer scientific and technological knowledge to associated enterprises. The parks encompass all fields of knowledge in order to cater to diverse human needs. Due to this focus, they prioritize human and social sciences, technology and applied sciences. The projects supported by the SPIPs should foster or generate initiatives that:

- Respond to people's real demands.
- Seek to provide solutions that are within any person's reach, independent of income and personal limitations.
- Add social value to existing solutions, thus ensuring that they are more acceptable to all and aware of gender equality,
- Develop more capacities and opportunities, foster the participation of beneficiaries, are better adapted to the cultural context and preserve the environment.
- Economize resources, procedures and costs of transmission to beneficiaries.
- Are in keeping with the resources within beneficiaries' reach.

The parks should organize themselves as independent legal entities, as autonomous bodies, linked to the university. Their boards of administration should include representatives from the university, enterprises with a corporate social commitment which operate in the area and local and regional governments. They require a small management team which, supporting the board, deals with innovation-related aspects, financing, creation of enterprises, institutional relations and administrative management. They should have a powerful communication and information platform in order to manage data and contacts, house complete experiments or groups engaged in innovation in similar fields, promote virtual meetings and undertake shared distance working (SIPISP, 2008). The general model of this park is set out in Figure 1.

Advocating the creation of enterprises and innovation, the SPIPs propose innovative services and projects which respond to the most important demands and needs of regional and local development, fostering the empowerment and improvement of the capacities and opportunities of people and institutions. The following common services complement and reinforce this proposal: innovation methodology, financing, legal and intellectual property advisory services, internationalization, communication, marketing and publicizing.

Park units should be established in keeping with detected needs and demands of the community, and the available resources of the university. Each area should have a director, a manager responsible for project administration and coordination and specialists or consultants who are in charge of the development of innovative projects. In addition, each area is supported by the Park's management team and shares common services and infrastructure (SIPISP, 2008).

Each unit and its projects are required to:

- Adjust themselves to an economic and financial feasibility model in consonance with the strategies of the governing bodies of the innovation park.
- Collaborate with other areas of the park in the development of innovation activities.
- Be a benchmark in terms of innovation and knowledge of the market in their respective fields.

The creation of enterprises is tied to the innovation activities which lay at the origin of the parks' creation. The aim is to transform an initial idea into a real innovation which has value in the marketplace, fulfilling a firm's initial life cycle and its corresponding needs until its consolidation. To achieve this, parks should offer different services to entrepreneurs and enterprises, such as: a specialized center to evaluate an idea, and the means and advisory services needed to develop it; a community to connect to and grow; short and medium-term financing; and channels for its market placement (id., *ibidem*).

Enterprises collaborate with the unit of enterprises' creation through the knowledge they possess for evaluating and valuing an idea, through corporate development and economic returns from innovation and human resources. Each innovation project should be part of a unit's business plan, which in turn should be attuned to the park's strategic plan. The innovation process is supported by the training and development of both team members and clients and other interested parties and by participation in events in order to exchange information and knowledge. Thus, their network approach constitutes a strategy to enhance innovation parks' knowledge and innovation sharing, creating a communication platform that allows efficient and real-time interchanges regarding the different ideas and projects of common interest and leading to the creation of joint opportunities.

As financing is a key aspect of the setting up of SPIs, it is fundamental to have an initial feasibility plan. Given the scarcity of resources, it is important for parks to be able to provide products and services that are attractive to financing institutions. The resources needed to support the development of projects in diverse areas of knowledge should be obtained through contracts between enterprises, government and foundations; government subsidies for a specific area or those which contribute to established public poli-

cies; from development finance institutions; from the sale of products to enterprises; the benefits obtained from intellectual property rights when acquired by for-profit organizations (SIPISP, 2008).

The kind of activities delineated here constitutes a complex process, which requires the cooperation of multiple actors of different types with diverse values and objectives. Their planning thus requires the adoption of sophisticated methodologies that are appropriate for complex systems.

Planning of Innovation Parks

The problematique of Science and Technology Parks and Innovation Parks is characterized by Gonzales (1997) as complex, with intrinsic elements of uncertainty and an elevated potential for conflict between actors. This author considers that the central aspects of this problematique are constituted by the set of heterogeneous and numerous actors, each with their own activities and objectives; the interface role of the university with the productive sector, which is controversial and complex; the effort required by technological development; the need to develop the technological capabilities of sources adequate for the undertaking; the attraction of enterprises and their growth process; the need to set up appropriate financial and physical infrastructure.



Figure 1: General Model of a Services for People Innovation Park. Source: SIPISP (2008).

In a general analysis, Gonzales (1997) highlights five fundamental points in the problematique of technological complexes and parks:

1. Existence of diverse institutional and individual actors involved in the undertaking, characterizing an 'inter-organizational domain' thus meaning that one should focus on the group of organizations and not just on a single organization;
2. The role of these institutions as instruments designed to establish close ties between technology generators and the productive sector.
3. The complexity, uncertainty and dynamics of technological development.
4. The development of commercially usable technological innovations in the sphere of the complex requires the development of the consolidated technological capacity of technology generating agents in a cumulative process that follows a sequential and evolutionary pattern. (Gonzales and Melo, 1993).
5. The firm generation and growth process, covering the embryonic, prematurity and maturity stages that each requires an adequate physical infrastructure is central in the problematique. (Bolton, 1993, apud Gonzales, 1997).

According to Gonzales (1997), the fundamental categories of this problematique are: the complexity, conflicts and uncertainties of these environments. This high level of complexity is due to inter-organizational activities and specific projects, the characteristics of technological capability building, innovation and development, the processes associated with the technological and business flows involved, the deployment of a primary operational and financial infrastructure, the integrated treatment of these aspects and political influences. The sources of potential conflicts between actors are to be found in the heterogeneity of their values and objectives, the different missions of the organizations involved and the interface role played by the complex or park.

Planning of Complex Systems

The complexity, conflicts and uncertainty that characterize the planning, deployment and operation of Services for People Innovation Parks demand the use of appropriate planning methodologies. Thus, it is necessary to develop a characterization of the systems at issue and their environments.

Jackson and Keys (1984) analyze the effectiveness of methodologies in the solution of problems in diversified contexts, defining that the context of the problem is com-

posed by the type of system in which it occurs and the nature of its deciders.

According to these authors, a system's classification is based on the simple-complex dichotomy: "A simple system is perceived as being constituted by a small number of elements and the interactions between these elements are rare or at least less regular. A complex system, on the other hand, is seen as being composed of a large number of highly inter-related elements." (Jackson and Keys, 1984, apud Gama, p.25). The deciders are classified as unitary or pluralistic, according to their objectives: "A set of deciders is considered to be unitary, if they agree with a set of objectives for the whole system and take decisions according to these objectives. A set of deciders is pluralistic if they cannot agree with a common set of objectives and take decisions according to different objectives. The context of a problem shall thus be called unitary if the set of deciders is unitary and pluralistic if the set of deciders is pluralistic". (id., ibidem).

Analyzing the characteristics of Complex Systems, Vermuri (1978) identifies four fundamental points:

1. "In complex systems, not all the attributes of a system's parts are directly observable. As a result, it is difficult to completely understand the nature of the system. The causes of any problem may be obscure and this will affect an analyst's ability to identify useful solutions. It will also be difficult to determine the effects of any solution to a given problem without really implementing that solution.
2. In complex systems, the laws established to relate the actions of different parts of the system, when possible, will invariably be only probabilistic. Any attempt to use a quantitative approach to support the solution of a problem may, thus, merely provide information on probable effects.
3. Complex systems evolve as they are constantly interacting with the environment. Social systems exist in increasingly turbulent environments, thus making it difficult to predict environment-system interactions. In addition, for social systems to evolve successfully, the parts of the system should have some degree of freedom of action. The system's parts are intentional and it is this characteristic which enables the system as a whole to adapt to the environment. This autonomy of the system's parts is naturally fraught with difficulties as 'Solutions' to problems may produce unforeseen outcomes.
4. Complex systems inevitably involve 'behavioral' problems. Decisions taken in the system will be affected by political, cultural, ethical and other factors. This makes it difficult to gain a complete understanding of the logic behind decisions taken by actors. Mutable values are an important internal source of change in such systems." (Vermuri, 1978, apud Gama, 1987, p. 26).

The Adaptive Planning Process

According to Melo (1987), planning in the second half of last century evolved from a centralized, sequential and systematic approach, called Comprehensive Rational Planning, to the other extreme of complete fragmentation, with Disjointed Incrementalism (Lindblom, 1959). Adaptive Planning is a synthesis of the evolution of Comprehensive Rational Planning and Disjointed Incrementalism, based on the Adaptive System Paradigm, as represented in Figure 2.

The Adaptive Planning approach deserves attention as it constitutes a “continuous learning process which demands the effective participation and involvement of members of the organization which adopt it and which, based on a holistic vision, requires the coordination of actions and the integration of different organizational levels.” (Trist, 1976, p. 11). This methodology’s origin lies in the Active Adaptive Systems Paradigm, which investigates the nature of human systems and their environments to analyze the nature of systems. Ackoff and Emery (1972) highlight four basic assumptions of this paradigm:

1. These systems are open: there is a continuous process of exchanges with the environment and thus, their behavior is conditioned by elements of the external and internal environments.
2. They are adaptive: capable of responding to changes in the environment, modifying their own behavior or environment.
3. They are active: their behavior does not depend only on adaptation to the environment, but also on their independent modification capacity.

4. They seek ideals: they are capable of creating and pursuing new ideals.

This type of planning is characterized by a continuous monitoring of implemented actions and the permanent evaluation of these actions which results in a constant redefinition of objectives and targets (Melo, 2002).

Adaptive Planning constitutes an appropriate proposal for responding to the challenges of the passage to the new millennium, as it has the properties necessary to administer uncertainty, complexity and interdependence (Melo, 2002).

According to Melo (1987), the fundamental properties of Adaptive Planning are: maintain a balance between flexibility and commitment; provide alternatives whose impacts guarantee irreversibility; permit a constant reflection on, and review of, actions that do not contribute to desired results. The main characteristics of this process are (Melo, 2002):

- extension of planning to the normative level, transforming the discussion of shared values into a basis for establishing guidelines for those involved in the process;
- emphasis on the formulation of the problematique, focusing on, and seeking to understand inter-relations and their impact on member organizations;
- active adaptation and proactive stance, seeking to influence the environment so that it may become more favorable to the organization’s objectives/purposes;
- quest for an optimal degree of involvement between members who, through active participation, assume joint responsibility for actions planned;
- flexibility, with the constant examination of planned objectives and evaluation of actions implemented, permitting the redefinition of actions;
- adoption of an action-research methodology which enhances organizational learning through the reflection on the effects of actions undertaken and thus the identification of new concepts, paths and methods; and
- search for a radical transformation of the system, always trying to make it more compatible with its inter-organizational domain through integrated and coordinated processes.

Pava (1980) states that active adaptation has two main lines of action: Normative System Redesign and Non-Synoptic System Change. In the former, the whole system is redesigned and norms are constantly debated, thus constituting a continuous process. The second line proposes incremental changes that may affect the whole, seeking transformations with implications for this whole. Thus, Pava identifies two strands of Adaptive Planning, one which, from the very beginning, seeks a desired state for the system and another which, although seeking to modify the whole, proposes a gradual incremental change, identifying nodes of transfor-

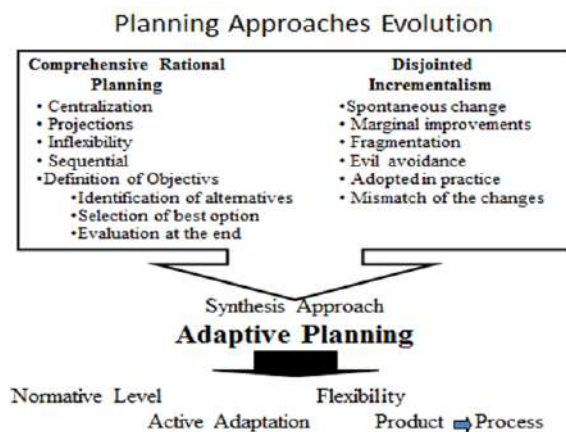


Figure 2: Evolution of Approaches to Planning.
Source: Prepared by the author.

mation that can make it possible to gradually disseminate change throughout the whole system (Melo, 1985).

Among the methodologies proposed for each strand, one should highlight Normative Planning –NP and Innovatory Planning-IP. In NP, proposed by Ozbekhan (1977), there is a process involving bringing decisions forward and a controlled change in the system, thus enabling planners and deciders to have a more systemic view of reality, emphasizing the problematique, the project and the intervention.

The aim of IP, developed by Melo (1991; 1992; 2003) based on Articulated Incrementalism (Melo, 1977), is to characterize the planning strategies, processes, methods, attitudes and stances most appropriate for innovative organizations. This planning begins at the normative level, setting out the values involved. It is developed through action-research, which permits the bringing forward and implementation of technical, social and managerial changes that enable the organization to seek new technological solutions to cater to the unceasingly evolving demands of a turbulent environment.

Non-Synoptic Adaptive Planning requires a specific kind of agile and flexible organizational support with the following properties (Melo, 1987):

- focus on a group of highly interdependent organizations, whose joint action makes them apt to operate in a heterogeneous and turbulent environment, characterized by a high degree of uncertainty. This approach requires a change of focus, concentrating on the inter-organizational level, and the redefinition of the planner's role as an agent for the formation of collaborative organizational networks;
- high degree of collaboration between organizations, whose actions should be complementary;
- reticulation process (Power, 1971) through which communication channels and mechanisms that permit a better interaction between organizations which are components of the multi-organization are identified;
- high degree of plurality of the organizations involved, sufficient to deal with a stimulating heterogeneous environment capable of providing efficient and ingenious responses for both simple and complex problems; and
- multi-sectorial organization in which the degree of interdependence and autonomy enables organizations to respond to the various demands of a heterogeneous and turbulent environment.

Services for People Innovation Park: a Complex System

The central aspects of the problematique of technological parks set out by Gonzales (1997), as described above, are reproduced in the SPIPs:

- A numerous and heterogeneous set of actors involved, each with their own activities and objectives. They involve various organizations (regional, national and international) each contributing their own experiences, structures, actions, programs, activities and objectives, which may be conflicting or complementary, compatible or otherwise. Examples of institutions involved are: the federal government, state government and directly affected municipal governments; highly active local educational institutions; seed capital funds interested in the focus of the Innovation Park and enterprises that are interested in partnerships with the university and incubated enterprises.

- The universities' interface role with the public sector which tends to be controversial and complex, with the efforts required for technological development, need to develop the technological capabilities of innovation generation sources up to the level needed by the undertaking, the firm attraction and growth process, need for appropriate physical and financial support infrastructure. This interface role is intensified by the SPIPs' mission to direct the efforts of those involved towards improving the population's quality of life, which then becomes the main actor of this 'system'. This makes it necessary to perform a series of adjustments in the relation between the university and enterprises.

- Inter-organizational operations at the institutional and specific project level, as the great driver of relations involving countless organizations to implement diverse projects and the party responsible for the system's governance.

- The specific characteristics of technological capability building, innovation and development. In addition to incentivizing entrepreneurship the SPIP aims at supporting innovations directed not only at technological but mainly regional development.

- Complex processes associated with the technological and business flows involved in the park.

- Setting up of the primary operational and financial infrastructure. Need to articulate what exists and create mechanisms to attract innovators who are capable of supporting and encouraging entrepreneurship.

- Influence of a political nature. Federal and state governments as well as the governments of municipalities which are directly affected should be articulated and integrated to strengthen the park's actions in the national sphere, besides ensuring that its political credibility attracts and consolidates the international support already generated through the Network.

The potential for conflict between actors is attributed by

Gonzales (1997) to three characteristics of parks which are compounded in the case of the SPIPs:

1. Heterogeneity of values and objectives of people. Heterogeneity not only exists between the various actors of the Triple Helix (university, government and enterprises) but also, and especially, between the universities, different spheres of government and diverse enterprises from different industries, which thus increases complexity.
2. Different missions of the organizations involved. As a consequence of the heterogeneity of diverse actors, the Park must recognize and seek to cater to many missions and objectives. These objectives may be grouped according to their degree of similarity and also according to direct or indirect conflicts.
3. Interface role played by the park/complex. An important role of the SPIP is that of articulator, motivator and guarantor of the values proposed by the Network in order to achieve objectives.

According to the analysis above, the SPIPs bear the characteristics of pluralistic complex systems, as defined, requiring actors to reconcile objectives to achieve their mission.

SPIP Planning Methodologies

The SPIPs were created in an attempt to set up a differentiated model of Innovation Park to cater to people's demands. The aim of these parks is to generate proposals that add social values to existing solutions, economize resources, procedures and costs of transmission to beneficiaries and are compatible with the resources that are within these people's reach.

The planning proposals advocated for the SPIPs, due to the nature of the sophisticated model that gave rise to them, must be compatible with the high degree of complexity, uncertainty and conflicts that characterize this innovation environment. An adaptive organization should be prepared to deal with change and this requires a high degree of flexibility. In the case studied here, the need to respond to the multiple stimuli emanating from the environment and its constant evolution require continuous adaptation. Given the complexity of the model and the existence of units responsible for specific actions, one should seek to integrate them, taking into account the issue of optimization and sharing of resources.

A basic element of adaptive planning, which guides the planning of the park, is the prior normative definition of values, principles and broad actions that govern its installation, as established in the original model. The planning of SPIPs begins at the normative level, in observing the

norms and values established in the model defined by the Ibero-American Network.

Active Adaptive Systems rely on appropriate forms of planning. Thus, Adaptive Planning is an approach that deserves attention here because it constitutes a learning instrument, requiring the effective involvement of members of the organization and making it possible to coordinate actions and integrate different organizational levels. In addition, it advocates the continuous monitoring of actions implemented and their permanent evaluation, resulting in the constant redefinition of objectives and targets and keeping a balance between flexibility and commitment.

In order to characterize the planning process analyzed in this article in terms of the main features of Adaptive Planning identified above, it is necessary to consider the degree of complexity of the social and technical systems involved in the type of innovation environment. In the case of the SPIPs, both the social and technical systems possess a high degree of complexity.

Thus, one may defend that, in the park planning process, it is more appropriate to use the Non-Synoptic System Change strand. In this approach, incremental changes are performed with the possibility and intention of radically affecting the whole.

The innovative character necessary for the environment studied, given its dynamism and complexity, presupposes planning using action-research, which is intrinsic to Innovative Planning, thus facilitating the quest for new technological solutions to cater to continuously evolving demands. It should be emphasized that parks will need to undertake constant reviews of their planning, due to their fundamentals, properties and environment. IP is adequate for maintaining their overall purpose and redirecting actions to achieve objectives.

Innovatory Planning is indicated for organizations like SPIPs that need to innovate. Beginning at the normative level which is necessary for initiating innovative planning, it identifies the values of those involved, which guide the whole planning process, and serves as a basis for the strategies, processes and methods and members' attitudes and stances.

Final Considerations

This article's general aim was to identify appropriate methodologies for the planning of Services for People Innovation Parks, delineating elements that should be observed by those involved in the structuring of this process.

In order to gain an understanding of the planning process, the research presented theoretical references regarding the

planning of complex systems, highlighting the concepts of the theory of complex systems, the problematique and planning of Science and Technology and Innovation Parks, the adaptive planning process and its methodologies.

A deeper study of the problematique in Science and Technology Parks led to the identification of fundamental points to be considered in their planning, especially the inter-organizational domain, the role of the park in articulating the relations between technology generating sources and the productive sector, the complexity and uncertainty of the dynamics of technological development and the need to develop agents' technological capabilities.

After obtaining an understanding of the problematique inherent to park planning, the article set out the characteristics to be considered in this process, the most important of which are: the heterogeneous set of actors involved who are subject to influences of a political nature, the difficult, controversial and complex role of articulating universities with the public sector; the need to set up an appropriate physical and financial support infrastructure, the specific requirements of technological development, innovation and capability building and the complex processes associated with the technological and business flows involved in the park.

The study of the properties of complex systems helped to identify fundamental aspects that cannot be neglected in the SPIP planning process. It became evident that there is a need to consider its constant evolution, affected by its interaction with the environment, behavioral problems and other aspects related to the decisions taken in the system, affected by political, cultural and ethical factors, which make it difficult to understand the logic of decisions. Moreover, it was found that changing values are an important internal source of change in these kinds of systems.

Considering the model of Services for People Innovation Parks proposed by the Ibero-American Network, it was verified that the SPIPs possess the characteristics of an active adaptive complex system in a pluralistic context. Traditional planning was deemed to be inappropriate for this type of system, as it fails to take the cited characteristics into consideration, making it necessary to identify planning methodologies that are more appropriate for this specific case.

Thus, the study identified appropriate planning methodologies to deal with this type of system, suggesting the use of Adaptive Planning in its Normative and particularly Innovative Planning modalities, which are especially appropriate given the learning generated, flexibility and emphasis on the normative level.

Based on the items studied, it was possible to highlight fun-

damental elements for the planning of Services for People Innovation Parks, especially the need for network participation with a high degree of collaboration, maintaining the plurality of organizations, including sectorial aspects, to cater to a heterogeneous environment, which requires a reticulation process to guarantee the identification and deployment of organization interaction mechanisms.

It should be highlighted that this process should be based on continuous and monitored exchanges with the community, given that the park influences, and is influenced by, the external and internal environments. Therefore, it is essential to develop the capacity to seek ideas, create and pursue new ideals that respond to change, modifying their own behavior or the environment.

The further application of the concepts of Active Adaptive Complex Systems to Innovation Parks is proposed, thus permitting the identification of new characteristics that would enable new methodologies to be developed. The elements presented in this study can probably be used in the development of indicators for the planning and evaluation of Science and Technology Parks, Innovation Parks and other innovation environments.

It is hoped that this study will be helpful in obtaining a better understanding of the Services for People Innovation Park process and also orient new studies on third and fourth generation innovation parks, thus permitting a more consistent definition for the theme's related issues. The results of this study may serve as a basis for the implementation of government policies and programs in the federal, state and municipal spheres that support the generation of undertakings in innovative environments, and thus contribute to the planning of innovation parks with similar characteristics to those of the SPIPs.

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