

The future center as an urban innovation engine

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Abstract

Purpose – The purpose of this article is to describe a future center as an urban innovation engine for the knowledge city, to understand the success factors of a future center and how this success can be replicated systematically in the implementation and development of future centers in the future.

Design/methodology/approach – Nine future centers were visited and a longitudinal action research-based case study was conducted at the regional Be'er Sheva PISGA Future Center in Israel, within the educational domain.

Findings – There are 13 conceptual building-blocks for a future center and the unifying principle is conversations. The PISGA future center put the concept of a future center into action and was guided by six operating principles: values, experiment and learning, organizational structure, partnerships, physical space, and virtual space. They were able to initiate ten new educational projects within the first two years of operation. A conceptual model of a regional future center was developed and tested on the PISGA case, defining the five key ingredients as community conversations, future images, an innovation lab, a knowledge and intelligence center and implementation projects.

Research limitations/implications – After two years of testing the findings, only intermediate results are available. Further research is needed to develop and test the concepts and model further.

Practical implications – This paper provides building-blocks and a generic model that can be used by the creators of next generation future centers.

Originality/value – This paper provides the first generic building-blocks and the first generic implementation and operational model for a future center.

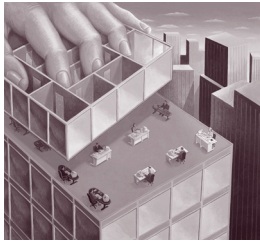
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Introduction

Now change the perspective. Look forward instead of backward and the creation of value is revealed to exist in the future, i.e. the time line and your management of the future "space" from the next few seconds to eternity (Edvinsson, 2002).

An "urban innovation engine" is a term used to describe a system which can trigger, generate, foster, and catalyze innovation in a city. Typically, it can be used to explain a co-evolving complex system that includes the interactions between people, relationships, values, processes, tools, technology, physical and financial infrastructures (Dvir, 2003), from which emerges novelty, spontaneity, and creativity. This paper puts forward the argument that properly designed and operated, various types of urban institutions, such as the city library, the regional museum, the town hall, the stock exchange, the central piazza, educational institutions and even the local neighborhood café can be transformed into active and vibrant innovation engines that impact their environment, engaging citizens and other stakeholders in educational, cultural and economic innovation activities (Dvir and Pasher, 2004). It is here proposed that urban institutions can also be transformed into a particular type of innovation engine, namely a future center. To elaborate the conceptualization of the future center and the significant factors which are required for successful implementation of



it, this paper presents the case of a regional educational institute that transformed itself into an urban innovation engine by adopting the principles of a future center from a growing number of business and public future centers that were established in the last decade.

The first future center was conceptualized by Leif Edvinsson and established by Skandia, a Swedish insurance company, in 1997 (Edvinsson, 2003). Since then, additional public and commercial future centers have been created. Although little has been written on them in the literature, future centers are known in practice as facilitated working environments which help organizations prepare for the future in a proactive, collaborative and systematic way. They are used to create and apply knowledge, develop practical innovations, bring citizens in closer contact with government and connect end-users with industry. They are used by government organizations for developing and testing citizen-centered, future-proof policy options with broad acceptance by stakeholders. They are used by businesses to increase the customer-driven, user-centered quality of new products and services. The centers also support employees within these organizations to develop and test new ways of working and new technical tools. They are also a breeding-ground for innovation, societal renewal and for enhancing and applying the intellectual capital of organizations, sectors, regions and nations.

Future centers assume different forms in different organizations. There are future centers currently operating in public administration, in geographical regions, and in multinational industries. Future centers can be broadly categorized into three groups: corporate business-oriented future centers; public future centers – established by a public organization such as a ministry or government agency, in order to catalyze future development in specific domains at the national level; and regional future centers.

Table I categorizes six existing or planned future centers into the three categories identified. However, it should be noted that some future centers might belong to more than one of the three categories.

A future center can be thought of as a complex system composed of multiple interlinked elements, or, to choose another metaphor, as a systemic bridge to the future. Both metaphors are helpful in order to shift the emphasis of focus onto the fundamental elements required for future centers and in order to mentally conceive how they function in relation to the future.

With reference to the complex system metaphor, the complexity science domain provides the vocabulary with which to articulate evolutionary dynamics and action of interrelated phenomena over time and space with greater degrees of holism and in terms of interconnected and intangible factors. Under the conceptual umbrella of complexity science, the theory of complex adaptive systems (CAS) can be used to describe how interacting agents in networked systems adapt and co-evolve over time, and who, through

Table I Future centers by category		
<i>Category</i>	<i>Description</i>	<i>Example</i>
Corporate business-oriented future centers	Established by commercial organizations, as an instrument to promote business and technological innovation, and identify and trigger future “growth engines”	Ericsson Foresight, Sweden Skandia Future Centre, Sweden
Public future centers – national or ministerial level	Established by a public organization such as a ministry or government agency, in order to catalyze future development in specific domains at the national level	Country House, Ministry of Economics, The Netherlands Commissionaire for Future Generations, the Knesset, Israel
Regional future centers	Established by the local authority or a coalition of regional and national organizations, in order to promote regional development based on future oriented thinking and local entrepreneurship	Momentum, Denmark, Pisga Be'er Sheva, Israel

their networked interactions, produce novel and emergent order in creative and spontaneous ways. In this vein, organizational scientists have applied complexity science to the way networks, organizations and the people in them interact and operate (Beinhocker, 1998, 2001; Regine, 1998; Webb *et al.*, 2006). This shifts attention for example in the organizational strategy field, to the learning school, where strategy formation is acknowledged to take place as an emergent process, and the cultural school, where strategy formation is seen as a collective process (Mintzberg *et al.*, 1998). In both cases, the focus is on outcomes from networked communities of people. Agents within a complex adaptive system, or people in networks within and between organizations, are thought to behave according to simple rules in their local, and random, interactions with one another, and power is decentralized (Johnson, 2001). According to Stacey (2003, p. 237):

A complex adaptive system consists of a large number of agents, each of which behaves according to some set of rules. These rules require the agents to adjust their behavior to that of other agents. In other words, agents interact with, and adapt to, each other.

In this sense, it becomes relevant to look at the interconnecting elements of the system of a future center. It is even more important to consider how a future center can provide the right enabling environment to create a conceptual link, or bridge, between the networked communities of people it involves and the future that they seek to create between them. The bridge metaphor is key to taking this thought further, and is aided by a literary quote (Calvino, 1972):

Marco Polo describes a bridge, stone by stone. "But which is the stone that supports the bridge?" Kublai Khan asks. "The bridge is not supported by one stone or another", Marco answers, "but by the line of the arch that they form". Kublai Khan remains silent, reflecting. Then he adds: "Why do you speak to me of the stones? It is only the arch that matters to me". Polo answers: "Without stones there is no arch."

Stones, or building blocks, are a powerful way with which to communicate the important factors contributing to the essence of what this research concluded was significant about future centers.

This paper will present the findings from visiting nine future centers and a longitudinal case study in one regional future center. The data collected was analyzed to identify 13 building blocks for future centers that are described in this paper. The in-depth case study identified how a regional future center can be implemented in the educational domain and what it can achieve. This case study was used in conjunction with the findings from the future center visits to develop a generic conceptual model for the implementation and operation of a regional future center, which is presented. Finally conclusions are given to identify the contribution to knowledge of this research and to identify outstanding research questions.

Research approach

In order to understand more about future center building blocks, a series of research visits were made to nine corporate, public and regional future centers over a three-year period from 2002 to 2005. These visits were supplemented by an in-depth longitudinal case study, carried out by means of a participant observation role at the (regional) Be'er Sheva PISGA future center. The main researcher involved in the study provided one day of facilitation per week to the future center over a two-year period. In addition, active involvement with a future center community of more than 50 members enabled greater insights to be derived through action research and a focus group style approach. In this context, it was made possible to visit a diverse range of future centers, and work on the development of the PISGA Future Center case. For all visits, meetings and focus groups, the conversations and interviews were noted and later transcribed, so that they could be analyzed for key themes. This led to the development of the thirteen conceptual building blocks described in the next section, which correlated with earlier results relating to innovation ecology (Dvir *et al.*, 2002) and urban innovation engines (Dvir, 2003). The combination of the findings from the nine future center visits and the detailed longitudinal case study of the PISGA Future Center led to the development of a generic conceptual model for the implementation and operation of a

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regional future center. This has been developed, applied and tested over a two-year period within the PISGA Future Center.

Conceptual building-blocks for a future center

The analysis of the data collected during this research led to the identification of 13 conceptual building-blocks for a future center. These are time, physical space, teams and leadership, tolerance of risk, strategy, virtual space, structured and spontaneous processes, knowledge management, financial capital, diversity, attention to the future, challenge and the unifying principle – conversations. Each of these is briefly described below.

Building block 1. Time

New ideas require exploration before their value can be demonstrated to others. Innovative organizations give people the freedom to use some of their time to explore ideas without having to ask permission (Pinchot and Pellman, 1999). Future centers provide people with the opportunity to leave their daily routine and dedicate time to thinking and preparing for the future.

Building block 2. Physical space

In an economy based on innovation, what better use can there be for space than to inspire creativity? Several innovative organizations believe that creative space – both the shared space and the private office – can significantly contribute to the organizational atmosphere of wild ideas, action, positive chaos, open mindedness, and barrier-breaking behavior (Ward, 1999; Kelley, 2000). The playful design of most future centers clearly demonstrates this idea. Almost all future centers are composed of multiple working areas, each featuring a completely different atmosphere.

Building block 3. Teams and leadership

A strong team as well as visionary leaders are essential building blocks of the future centers studied. These leaders are usually carefully selected and trained masters of group processes, facilitation, creativity, change management processes and complementary skills. The future center was always the vision of (“dreamed up by”) an influential person from within the organization, who recognized the need to renew the organization – and take a systematic approach towards this end.

Building block 4. Tolerance of risk

Innovative organizations promote risk taking. Innovation requires learning new things, experimentation, and pushing the boundaries of the unknown. The leaders of such organizations invite and reward (clever) risk taking and do not punish mistakes. Failures are taken as golden learning opportunities. Future Centers encourage out-of-the-box thinking, breaking assumptions and taking risks.

Building block 5. Strategy

In an innovative environment, the vision and strategic intent of the organization is clearly communicated to all employees. This joins all creative forces and energies and directs them towards the strategic benefit of the organization (Pinchot and Pellman, 1999). In our visits to nine future centers, we discovered that if they were not working closely with the organization

strategy, they might suffer from being seen as too detached from reality and of little practical value to the organization (in other words, seen as an “ivory tower”).

Building block 6. Virtual space

In the typical innovative organization of the twenty-first century, technology has multiple supportive roles, such as facilitating collaboration between distant members and streamlining and catalyzing the flow of ideas, as demonstrated forcefully for example by the British Telecom Ideas Management Intranet system (Lakin, 2001). Nonaka, when discussing the concept of Ba, a space for knowledge creation, suggests that it can also take a virtual form, a “Cyber Ba” (Nonaka and Konno, 1998). In one future center in the Netherlands, extensive use of computing systems to enhance group discussions and meetings is made. The concept of the virtual future center, as a more accessible alternative to the physical center, should be further explored.

Building block 7. Structured and spontaneous processes

Academic studies have found that serendipity is key to recurring innovation. Since serendipity by definition cannot be ordered to demand, innovative companies must enable and protect the possibility that surprises can occur. Serendipity, intuition, experience, scanning, and relationships are sources of surprise (Cope, 1998). At the same time, without a powerful process to capture “good” ideas and turn them into value, most ideas will vanish without having a fair chance to make their way through a serious evaluation, development and “testing funnel” phase. Maintaining a degree of tension between structure and creativity can be useful, and the inherent conflicts between them should not be completely resolved (Brown and Duguid, 2001). In all future centers, extensive use of robust creativity, innovation and futurizing supporting methodologies, processes and tools is made – some of them developed by future center teams themselves.

Building block 8. Knowledge management

Management of the existing knowledge of the organization provides a solid foundation for the creation of new knowledge (Ruggles and Ross, 1997), which should be acknowledged as being embedded in values and processes as much as in the content this generates. In a typical future center, the library is located in a central place in order to make the knowledge resources accessible and symbolize the importance of looking at the past as well as sideways when preparing for the future. Similarly, most future centers are equipped with networked workstations to provide access to a virtual knowledge world.

Building block 9. Financial capital

Serious innovation requires significant investment in translating brilliant ideas into viable products and services. Innovative organizations allocate considerable resources to the various innovation phases. It was not an accident that Sydkraft’s Internal Innovation Fund was located within the company’s future center.

Building block 10. Diversity

Similar people will generate similar ideas. Some innovative organizations deliberately increase diversity in the work force. Diverse experiences, cultural backgrounds, professions, academic backgrounds, ages, and personalities contribute to the creation of fruitful dialogues based on multiple perspectives (Naimen, 1998). In the Skandia Future Center, the team used a third generation model, involving young, middle-aged, and senior employees, in addition to pensioners in workshops, in order to ensure multiple perspectives. For the same reason, about 50 percent of the participants at Skandia Future Center’s activities were from outside the company. Similarly, in the Be’er Sheva PISGA Future Center, the team insists on what they call a “360 degree” list of participants, with not only educators, but also business people, academics, artists, and others.

Building block 11. Attention to the future

In a turbulent environment, there is continuous tension between the day-to-day challenges, tasks and problems and the need to focus on the future. In organizations that excel at innovation, the top priority issue is the future. In other companies, most management and employee attention is directed towards “fire-fighting” and short-term objectives. “The future is 14 seconds away” argued Leif Edvinsson (2003), who then created the Skandia Future Center, with the explicit objective of “turning the future into an asset”.

Building block 12. Challenge

Open ended, non-structured tasks engender higher creativity than narrow jobs. Most people respond positively when they are challenged and provided with sufficient scope to generate novel solutions (Ahmed, 1998). We found that most future centers were established in response to a serious organizational challenge, like for example, when their mother organization faced a risk of fierce(r) competition for external players. A key assumption implied by this finding is that a future center that addresses non-critical issues is not sustainable.

Building block 13. Conversations – the unifying principle

Alan Webber argues that:

Conversations inside and outside the company are the chief mechanism for making change and renewal an ongoing part of the company’s culture” (quoted in Stewart, 2001).

They are a core element of all future centers, and “community conversation” is the core element of the model of regional future centers subsequently presented.

The next section presents the detailed case study of the Be’er Sheva PISGA Future Center in Israel, and illustrates how most of these building blocks have contributed to the implementation, growth and activities of a regional future center within the educational domain.

The Be’er Sheva PISGA Future Center case study

The city of Be’er Sheva is a busy capital in southern Israel with more than 200,000 inhabitants. In 2003, a task force led by the deputy mayor decided to strategically define and position Be’er Sheva as an “educating city”, which is a particular form of a “knowledge city” (Dvir and Pasher, 2004). The task force is focusing on multiple streams of action and educational intervention programs such as the creation of centers of excellence. The future center described in this paper is part of the strategic program to turn Be’er Sheva into an educating city.

The PISGA Future Center is a center charged with the ongoing development of teachers after their graduation. PISGA is a Hebrew acronym for the “development of teaching staff”. The Be’er Sheva PISGA Future Center is also one of the members of a national network of more than 20 centers. The center is responsible for developing the teaching staff of Be’er Sheva and the surrounding region, serving a population of 6,000 teachers, and offering approximately 100 teacher development courses as well as a wide range of supporting services and resources.

The history of the PISGA Future Center

In 2002, the Be’er Sheva PISGA team went through a comprehensive process of defining its identity and core values. Five pedagogical values were identified and agreed upon for

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adoption. Coinciding with this, the Director attended a lecture on future centers and decided that a sixth value was missing: continuous renewal of the institute, its educational services, and its pedagogical approach. Growing dissatisfaction by the general public and the teachers with the current education system reinforced the criticality of renewing the system and modifying it in line with the emerging needs of the Israeli population in general and the Be'er Sheva city and region in particular. The challenges were numerous: integration of Bedouins, integration of new immigrants, global competition, enhancement of technological and scientific education, and so forth. Charged with the vision of upgrading the teaching staff development to address these challenges, the PISGA Center Director made the strategic decision to transform it into the first regional educating city future center in the world. It then took the PISGA team, facilitated by future center and educational innovation experts, 12 months to plan the subsequent concept of the PISGA Future Center.

The intensive planning process was required due to the complexity of the challenge, which was to transform an ordinary teacher development center into a future center and ensure its sustainability and relevancy to the real needs of the city. However, this long process was used as an opportunity to achieve three objectives:

To involve stakeholders so that their voices would not only be heard but would also impact the vision as well as the detailed particularities of the center.

To experiment and create prototypes of some of the methods that would be used in the different functions of the future center, once established (referred to as "modeling").

To learn-through-planning and discover together the different aspects of the future center.

At each meeting, a standard format was followed. At each meeting, one of the envisioned methods and tools was tested. For example, in one meeting "future images" of the future center were created; each group conceptually created and visualized a different vision. For another meeting, a group visit was made to a remote desert Alpaca Ranch to interview the rancher on the topic of "true entrepreneurship".

Towards the end of the planning phase, the team decided to propose the planned future center as an officially recognized experiment of the Ministry of Education, as part of a prestigious group of about thirty breakthrough educational initiatives sponsored by the Experiments Department. In September 2004, the experiment was approved and the future center started its operation.

Putting the concept of the future center into action in the educational domain

The generic concept of the future center was modified to the challenges of the education system and the missions of the Be'er Sheva PISGA Center and a systematic model was designed and operated. The model consists of five main modules: community conversations, future images, a laboratory, implementation space and a knowledge and intelligence center. These are described in more detail in Figure 1. Although a sequential process is presented, in real-life situations deviations from this generic process might frequently occur in order to address different needs, maturity levels and the context specific situations of end users and targeted challenges.

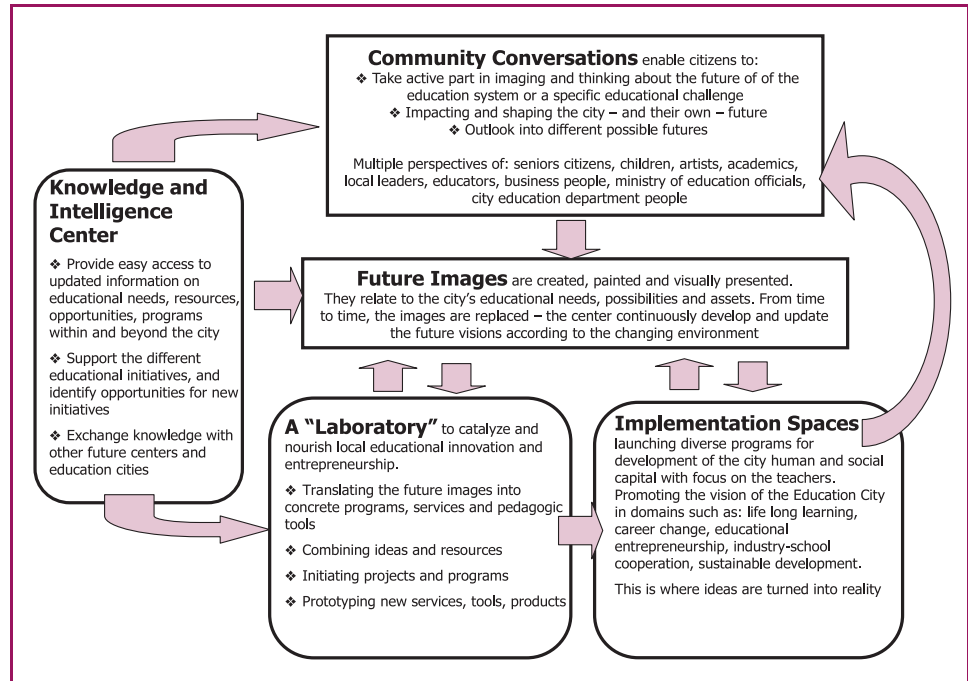
Operating principles of the PISGA Future Center

The routine operation of the PISGA Future Center, as well its development, is guided by a set of operating principles. The most influential of these principles, described in detail below, are: values, experiment and learning, organizational structure, partnerships, physical space and virtual space.

Values. A future center without solid core values is just a technocratic instrument. The PISGA Future Center has defined a set of six core values – and they provide the pedagogical basis for its operation. The core values of the center are: renewal, systematic approach, sharing, needs focus, action learning, and assessment.

Experiment and learning. Before the future center was established, a rough conceptual model was created. Since then, the model has been continuously upgraded, deepened and

Figure 1 The regional future center concept: a systematic process for addressing future challenges



refined; tools have been enhanced and new ones invented; and, alternative approaches have been experimented with. For example, the team experimented with multiple alternative processes for creating conceptual images of the future. The team acts as a real learning organization. After each action, an after-action review is conducted and lessons learned are fed into a toolkit repository. Moreover, each weekly meeting of the team includes a short learning session, where one of the team members presents and discusses a new tool, method or approach related to the future center operation. The center team also learns from other future centers, through physical or virtual visits to future centers in other countries and meetings with the international future center community. The PISGA Future Center contributes to the international OpenFutures research project as well as benefits from it through the new methods explored by it. Moreover, as was noted earlier, the future center is recognized as an official five-year “experiment” by the Experiments Department of the Ministry of Education, and therefore is expected to continuously experiment with new pedagogical and organizational approaches and disseminate its learning to other educational institutions.

Organizational structure. The future center is co-led by the PISGA Center manager and the “future center experiment” leader. In addition, an expert from the Experiments Department of the Ministry of Education accompanies the center, a steering team steers it, and a team of two innovation experts facilitate the development process of the future center. The PISGA Future Center team consists of seven professionals, most of whom work part time. The future center operates based on a matrixed configuration – there are six functional centers, and each is led, operated and developed by one team member. The functional centers are: The Knowledge Center, The Innovation Lab, The Physical Space Design, The Learning Space, Community Conversation and Future Images, and Assessment and Documentation. These functional centers support concrete projects focused on a specific educational domain and objective (for example, “sustainable education 2020”, “the physical educational environment in the future kindergarten”, “ICT in education” and so on). Again, each project is led by a team member.

Partnerships. The PISGA Future Center does not have “clients”. It works in collaboration with multiple organizations and individuals, based on a systematic “take-in” process which is exercised at the beginning of each project. The process identifies the expectations of all actors involved in an educational project and maps the available resources, the basic assumptions and the “rules of the game”. As the available resources are limited, and the education system is complex and sometimes “political”, such collaboration is critical to an project’s success.

Physical space. A physical environment that encourages a creative and open atmosphere was an important part of all future centers visited during the course of this research. The impact of the environment on the creativity of the individual as well as on group dynamics was well explored. In Be’er Sheva, the central working space was redesigned. Today, it includes a wide range of working spaces, each offering different opportunities for group work settings. Using a relatively low budget but a rich set of colors, materials, images and seating arrangements, a clear sense of “out-of-the-box thinking” was created. It should be noted that the future center physical environment is not limited to the PISGA building, but it extends to additional sites and also includes the way in which some activities are conducted in places like the desert Alpaca ranch, a Perma-culture agriculture farm, and an artist’s workshop hanger at the Dead Sea.

Virtual space. It was found that face-to-face meetings were critical to the possibility of rich community conversations occurring. However, the team now explores various eLearning technologies in order to enhance teaching staff development. Face-to-face meetings are also complemented with virtual future images workshops, as a way to provide more citizens with access to future oriented processes.

Projects initiated by the PISGA Future Center

During the first two years of its operation, the PISGA Future Center initiated ten projects, which focus on diverse fields and challenges of the city educational system. More than 500 stakeholders – teachers, supervisors, local industry people, representatives of the Be’er Sheva municipality, parents and children – were involved. Table II briefly describes these projects.

Although there is a systematic operational model in place, PISGA staff do not follow it rigorously. In the case of some educational challenges, the full process is followed in a sequential order of a community conversation that creates future images, which are then developed in the innovation lab and implemented at the urban education system (implementation space). Other challenges are addressed in a less serial mode, for example “jumping” directly into the innovation lab with a specific idea, without going through the community conversation phase.

Conceptual model for a regional future center

From the research with the Be’er Sheva PISGA Future Center, we were able to derive that a Regional future center can serve a knowledge city in multiple ways, whilst complementing and leveraging the other knowledge-based initiatives of the city. It provides:

- A methodology to intensify the process of future thinking and channel it into action and reality.
- A framework for collaborative creation, shared future-orientated thinking and action of the three critical players in a true educating city: the extended multi-generation community, the local authorities and the educators.
- A place to systematically, transparently and continually present the relevant information related to the vision and development directions of the local educational challenges and potentials – this is a solid basis for future thinking and acting.
- A process to combine, pool, integrate and leverage the diverse tangible and intangible resources that exist in the city. This creates multi-perspective initiatives and projects.
- An opportunity to empower the citizen through (effective) participatory democracy.
- A space to shift from linear thinking to spiraling and co-evolving, shared visioning.

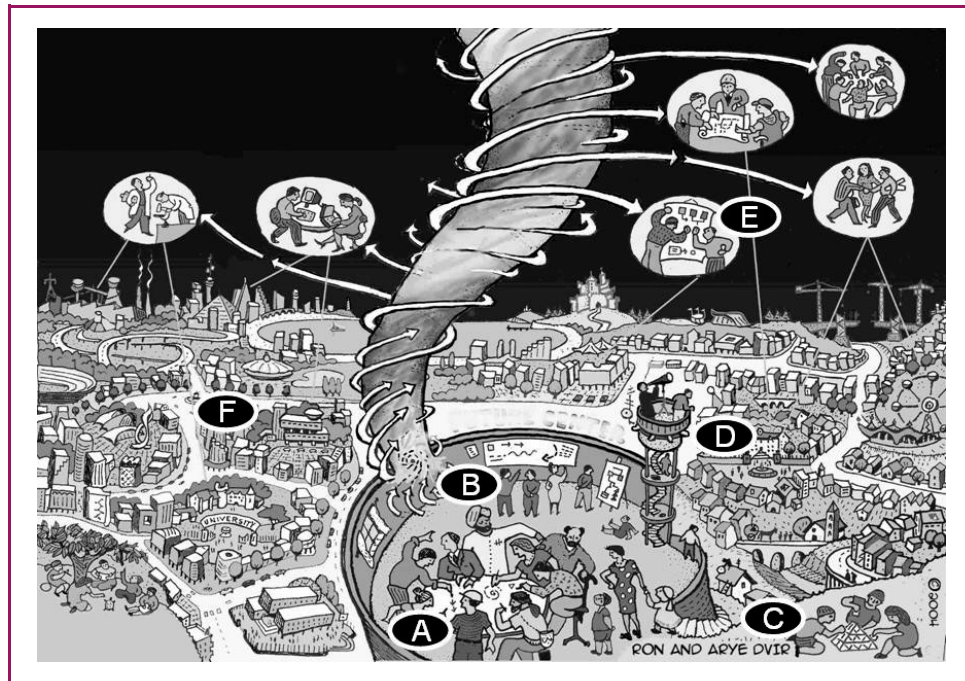
Table II PISGA Future Center projects

Sustainable Education 2020	An initiative triggered by the Commissionaire of future education at the Knesset aimed at exploring and creating a "future image" of sustainable education by a group of about 60 students and additional stakeholders. In collaboration with three colleges for teacher development (Achva, Key and Washington Hill). The first phase of this initiative will generate a manifesto for sustainable education based on six complementary perspectives. The manifesto will serve as one of the inputs into a national task force focusing on the future of the Israeli educational system
Information & Communication Technologies (ICT) in Education	A task force of ICT leaders in the city schools, aimed at drawing a future image of the smart integration of ICT into education, creating an assessment tool to support the realization of this vision
The Physical Educational Environment in the Future Kindergarten	A group of kindergarten staff, supported by professionals from disciplines such as interior design, addressed the challenge of revolutionizing the design of the future kindergarten, in order to provide the children with a better educational environment. Ten future images, based on different perspectives (e.g. democratic education, science, physiological development, and parental perspectives) were developed. Each of the kindergarten teachers who participated in the process adopted one of the future images and realized it in one space in her kindergarten
Chemistry 2020	The objective of this initiative is to upgrade the way chemistry is taught in city schools. As a large proportion of the country's chemistry industry is located near the city, this subject is particularly relevant to the Be'er Sheva PISGA Future Center. Initial steps towards collaboration between the education system and local industry emerged from this initiative
Science Education	The quality of science education is critical to the strategic position of Israel as a technological powerhouse. However, in recent years science education has faced serious challenges in terms of a decline in reputation as well as limited resources. The objective of this project conducted by the enthusiastic group of science teachers instructors and supervisors is to completely renew science education in the city. The team has agreed on both long term goals as well as short term objectives aiming towards tangible change over the coming year
Additional projects	These are numerous and include, for example, "The headmasters club", "Teaching staff instructors development", and the "Children right task force"

Analysis of the nine future centers visited revealed that no two future centers are the same. Each is crafted and developed according to the unique set of challenges it addresses; the environment in which it operates; the tangible and intangible resources available; and the visions, needs and characteristics of its creators. Perhaps for this reason and the relative newness of the concept of a future center, no generic implementation or operational model has been developed for them, even though more than 20 future centers have now been established.

This research has shown that despite each future center's uniqueness, there are thirteen common basic building blocks that can be identified across all of them, as described earlier in this paper. In addition, the findings identified in the detailed longitudinal case study of the Be'er Sheva PISGA Future Center, although focused originally within the education domain, could be generalized to build a generic model for Regional future centers. Figure 2 provides

Figure 2 A rich picture conceptual model for implementation of a regional future center



a rich picture of a generic conceptual model and emphasizes the necessary ingredients (A to F) for the successful implementation of a Regional future center. These are elaborated in the corresponding numbered sections below.

(A) – community conversations are at the heart of a future center. They address the future needs, challenges, trends and opportunities of the region or city. All stakeholders in the city are involved – citizens, students, artists, academics, municipal officials, local business people, pensioners and others. The multiple conversations address the challenges, needs and future directions of the city. The analogy of “mixing colours” guides this element – the mixing of different disciplines, ages, backgrounds and interests yields the best solutions which are always complex and “multi-coloured”.

(B) – future images are created in the community conversations which identify and illustrate the possible developmental directions of the local and global society, economy, and technology and their implications for the city. The center is used as both a workshop arena to create future images and as a gallery to present the images to the public. Various participatory techniques, such as “knowledge cafés” and “open space events” are used. While the starting point of the Future Images is a large brainstorming session, a more in-depth analysis and consideration of tangible application potentialities is provided afterwards, for example in the form of a focused research project into the possibilities offered by a particularly attractive image. This provides a strong indication that the continuous traveling and interchanges between future images and present challenges generates interesting insights and ideas.

(C) – the innovation laboratory is where future images are translated into actual actions. These images trigger invention and exploration of new (or upgraded) concepts, methods, programs, projects and tools which are developed and experimented with in the “innovation lab”. This is where existing tools and programs are upgraded to suit the region or city vision; new, future-oriented programs are developed and innovative methods are prototyped. While some of the work in the lab is done by the future center staff, other initiatives are led by stakeholders who come to the lab for longer-term periods such as two full weeks, or for one afternoon every week, to pursue their ideas. In such cases the future center team members can act as facilitators supporting the development process.

(D) – the knowledge and intelligence center serves the other modules by providing the required information for a futurizing and future-orientated process. It provides all users of the future center with access to the most up-to-date relevant information in the specific field – trends, predictions, state-of-the-art developments around the world, and emerging methods and tools. This information can be used to create better-informed future images, to develop future orientated methods without re-inventing the wheel and to stimulate community conversations.

(E, F) – implementation projects provide the city's inhabitants with the opportunity for self-fulfillment and the skills needed to handle the future. Programs are integrated with other projects developed in the city. Learning and realization of these programs takes place in the future center itself as well as in other parts of the city (F).

Conclusions

In this paper, a case study was used to elaborate a systematic process to enhance regional innovation in one specific field, namely, formal education. The process is supported by a well-defined organizational instrument, the future center. Strong and positive intermediate results can be reported two years after the birth of the Be'er Sheva PISGA Future Center. Ten wide-ranging and ambitious educational projects have been initiated. Some of these projects generated visionary Future Images and are now in the Innovation Lab phase. In other words, the process of developing concrete educational tools has begun and plans are in place to translate the future images into reality. Active learning and continuous development of the future center model, process and supporting tools is apparent. Approximately 500 stakeholders (teachers, headmasters and others from the local and national educational system as well as from the academic, business and municipal worlds) participated in the future center activities. Generally, feedback was very positive, and participants reported that added-value was gained.

The subsequent contribution to knowledge is manifested in four ways. First, a systematic model for the implementation and operation of a future center has been developed. Although more than 20 future centers have now been established in different domains and locations, there was no articulation of a systematic operational process. In the PISGA Future Center project, such a model was defined and tested. It is the intention that dissemination of this model will enable other future centers to learn from the Be'er Sheva PISGA case and adopt the model or parts of it. Second, the application of the future center concept to a new domain, namely education, is unique. A wide-range of educational institutions stand to benefit through adoption of the concept. The education system is critical to society as well as individual prosperity, and there is an urgent need to review and renew many aspects of the current education system. Third, the case is a cogent realization of the “urban innovation engine” concept (Dvir, 2003), as it shows how an existing urban institution can be upgraded and turned into an important actor that contributes to the renewal and innovation of a city or region. Fourth, the case is an interesting example of a concrete organizational instrument that supports the vision of the “education city” (Dvir *et al.*, 2002). Finally, as an example of a complex adaptive system, the Regional future center concept synthesizes the essence of co-evolving, adapting agents bringing novelty to bear in their own contexts of present-day and future relevance in their interactions with each other.

However, some questions remain unanswered by this research. For example, has the PISGA Future Center generated a new cadre of teachers who are more “future orientated” or has the Center contributed significantly to the renewal of the regional education system? It is still too early to answer these questions satisfactorily, although early indicators are positive. New

research initiatives are currently underway to begin to answer some of the as yet unanswered questions and to explore this emerging field around future centers and Urban Innovation Engines in more depth. For example, in May 2006, a consortium funded by the European Commission, entitled OpenFutures, launched a two year research project to understand future centers from four perspectives: organizational, methodological, physical and technological.

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