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Generations of Science Parks in the Light of Responsible Innovation

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Nowadays, knowledge becomes more and more important in the economy. Its increasing importance has placed knowledge-creating institutions in the focus of economic development strategies. Among these institutions, special attention is paid to universities because they ensure qualified workforce and provide the basis of new knowledge and innovation which are necessary for the long-term competitiveness of a company. Moreover, these factors could be the main drivers of the development of a territory. This is particularly important for lagging regions with universities because these regions can build upon universities to connect the regional economy to the processes of knowledge-based economy. The tools of economic development initiatives have also broadened with university-based development tools which contain the science parks as a subtype.

In addition to the above, as another important megatrend, the European Union is paying increasing attention to the subject of Responsible Research and Innovation (hereafter: "RRI"), which is not only one of the flagships of the 2014-2020 programming period but, in our opinion, has a major influence on the future level of success of science parks.

The aim of this study is to review the subject of science parks – primarily from the point of view of the role of universities in defining and walking these parks' professional routes. We wish to pay special attention to how responsible innovation can be introduced and consciously managed in the professional work carried out in science parks.

Keywords: science parks, responsible research and innovation, knowledge transfer, local economic development

1. Introduction

The forces driving the economy have undergone significant changes by our days. The former, cost-advantage-based competition between economic players has been replaced by a new type of competition, which is based on technology change and innovation. While the economy earlier used to be built on natural resources and cheap

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labour, we now see an economic structure that builds on *knowledge a new production factor.* Accordingly, the performance of both business organisations and regional and national economies is increasingly determined by their ability to create, disseminate and adapt new knowledge. This statement is true even if we are aware that, in many instances, new knowledge, new recognitions and new innovation results bring about unforeseen impacts on society. It is these unforeseen impacts that the European Union would like to keep on a manageable track through one of its most recent flagship concepts, Responsible Research and Innovation.

The increasing importance of knowledge, owing to its nature, has differentiated the economy also on a regional basis. In the proximity of knowledge creating centres, knowledge-based economic activities have become concentrated in a geographical sense. As a result, *knowledge-creating organisations have been placed in focus by many economic development interventions,* and of these organisations universities have aroused the keenest interest. Research projects have found that, of universities' impacts on the local economy, those related to universities' output – education and research activities – seem the most significant: it is these output related impacts that can bring dynamism to the local economy in the long term. The utilisation of these impacts is especially important in regions that give home to a university but are relatively underdeveloped: such lagging regions can become part of the processes of the knowledge-based economy if they rely on these institutions. Meanwhile, universities have become active shapers of their region's economy by enriching through the expansion of their traditional set of missions. In turn, *the set of economic development interventions has also significantly grown and now also include means that build on universities* – one such means being science parks.

It seems obvious from the above that well managed science parks as spaces of innovation – which pave the way for the establishment of connections between universities' knowledge base and economic players – can do a lot to put the concept of responsible innovation into practice as they gather a given region's highly significant research and innovation results and players. Therefore, it seems purposeful to examine how the system of science parks and the concept of responsible innovation[3] can be put in each other's service in a synergic way, paying special attention to the role of universities.

[3] For the purposes of this study, the term 'responsible innovation' carries the following meaning: *Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products* (von Schomberg 2013, pp. 51-74).

2. Science Parks

There is no uniform concept description of "science parks" in professional literature. *What initiatives are labelled by science and development policies with this term changes from country to country*. Extremely different development policy means (e.g. technopolis, business parks) are often also put under the "science park" umbrella term – incorrectly. Due to the large number of definitions and the difficulties around offering an accurate description, this study does not select any particular definition. Instead, we compare the most often used definitions and try to identify their points of intersection. According to a research carried out in 2010, *the definitions most often used in professional literature* are supplied by three organisations, which specialise in science parks (Albahari et al. 2010): the United Kingdom Science Parks Association (UKSPA), the Association of Universities and Research Parks (AURP) and the International Association of Science Parks (IASP). It seemed self-evident that we should use the concept definitions of these three organisations to get a more accurate understanding of science parks: the definitions applied by them seem to be suitable to get to know the main ideas related to science parks through the eyes of the actors working on the practical side (Table 1).

Based on the definitions examined, we can distinguish four elements that are present – explicitly or implicitly – in all of the definitions: the importance of geographical proximity and the (physical) environment; partnerships with knowledge-creating institutions, universities; encouraging knowledge/technology transfer; encouraging the creation of new businesses (incubation services). Science parks provide these abovementioned benefits along with an active managements support for their clients in order to fulfil their main purpose: facilitating innovation-oriented enterprises (Buzás 2002). Using these as a starting point and building on the research results of Capello and Morrison (2009), we can define the fours functions which a science park can fulfil in its region's economic system. These functions are the following: (i) the *technology transfer function,* i.e. mediating advanced technologies and supporting their dissemination, (ii) the *knowledge creating function,* i.e. the encouragement of the innovation activity, (iii) the *„seedbed" function,* which plays a decisive role in the creation of a special environment, and (iv) the *incubation function,* i.e. the encouragement of the creation of new technology-intensive businesses. Which of these functions is more dominant is strongly determined by the profile of the given science park and the identity and motivations of its owners. The abovementioned authors highlight the fact that *science parks, as understood in the traditional sense* (i.e. a real estate development in a given geographical region, where enterprises, research centres and universities are gathered), *can fulfil all of these functions at a high level, with the exception of technology transfer* (Capello–Morrison 2009). Buzás (2003) argues that the contradictions between formal technology transfer and geographical proximity could be resolved by well managed business services in the park. A science park could be a good location for new businesses but new

technology-based firms are generally not able to utilize all of its advances without the help of the park management. Thus, the factor of successful technology transfer inside a science park resides in well managed business services.

Table 1. Summary of the Different Definitions of Science Parks

Author	Definition
UKSPA[1]	A Science Park is a business support and technology transfer initiative that: - encourages and supports the start-up and incubation of innovation-led, high-growth, knowledge-based businesses, - provides an environment where larger and international businesses can develop specific and close interactions with a particular centre of knowledge creation for their mutual benefit, - has formal and operational links with centres of knowledge creation such as universities, higher education institutes and research organisations.
IASP[2]	Areas of innovation, of which science, technology and research parks (STPs) are a highly specialised type, play a key role in the economic development of their environment. Through a dynamic and innovative mix of policies, programmes, quality space and facilities and high value-added services, they - stimulate and manage the flow of knowledge and technology between universities and companies, - facilitate the communication between companies, entrepreneurs and technicians, - provide environments that enhance a culture of innovation, creativity and quality, - focus on companies and research institutions as well as on people: the entrepreneurs and 'knowledge workers', - facilitate the creation of new businesses via incubation and spin-off mechanisms, and accelerate the growth of small and medium size companies, - work in a global network that gathers many thousands of innovative companies and research institutions throughout the world, facilitating the internationalisation of their resident companies.
AURP[3]	A university research park as a property-based venture, which: - master plans property designed for research and commercialization, - creates partnerships with universities and research institutions, - encourages the growth of new companies, - translates technology, - drives technology-led economic development.

Note: [1]www.ukspa.org.uk, [2] www.iasp.ws, [3]www.aurp.net
Source: Edited by the authors

In most cases, the creators and owners of science parks are universities (IASP 2012). In the beginning, the dominance of universities so much influenced the operation of science parks that the purpose of the first park generations was only exclusively to broaden universities' economic opportunities. The actual motivation behind the creation of these science parks was to force the practical application of re-

search results in the economy. Thus, it is not a surprise that comparative studies about national systems of innovation consider science parks as a technology transfer organisation (Buzás 2002).Later on, as economic and innovation processes became more sophisticated, this trend faded away and, *in our days, science parks form an integral part of their larger region* and their aims have become more sophisticated accordingly.

A more detailed overview of the history of the three generations of science parks may help us understand the relations between science parks and universities. In the beginning, most science parks were established *in the outskirts of cities,* to revitalise run-down industrial areas, or were housed by *university campuses,* and their operation was managed by one single organisation (EC 2008). Later on, however, an increasing number of science parks were established *in city centres,* relatively farther away from university campuses. Meanwhile, naturally, their management and logic of operation also underwent significant changes, together with their attitude towards innovation. Based on these aspects, Annerstedt (2006) distinguishes three science park generations.

The creation of *first generation parks* was clearly inspired by the success achieved by Stanford University (Annerstedt 2006). This science park type is characterised by being located *in the immediate proximity of universities,* in an area designated for this particular purpose. It gives home to a variety of incubation and business services and has access to external sources of financing. Such parks are *managed* exclusively by the *university,* through some foundation or self-owned enterprise, and their key goals are to *broaden universities' economic opportunities* and to support university-related business activities and communities. First generation parks are organised and operate along the linear, "science push" model of innovation. What they consider as their most important task is to get new scientific results into their practical market utilisation in the quickest and smoothest way. Owing to this linear approach, the only thing that they consider as the basis of innovation activities is research and development and the results deriving from them.

Second generation science parks can also be considered as some sort of "extension" of universities, but they are not necessarily located in the immediate proximity or operate under their exclusive supervision (Annerstedt 2006). The key driving force of their operation is the creation of innovation oriented businesses and the support of their growth, rather than the economic utilisation of the university's research results. Hansson et al. (2005) identify the difference between first and second generation parks as follows: while *the aim of the former* is to create opportunities for new businesses *for the economic utilisation of their (i.e. the universities') economic results,* the latter focus on the *creation of technologies suitable for economic utilisation* and on *making university students entrepreneurs.* Besides, in the actual operation of businesses, the latter pay more attention to the needs and requirements of businesses and, as a result, such parks offer a broad portfolio of high quality services. Management tasks are mostly performed by some privately owned business

organisation, the representatives of the academic and local government sector being involved only in certain matters, which are related to the actual operation and regulation of the park. The approach of second generation science parks towards innovation can be described with the "market pull" model (Annerstedt 2006).

The *third generation of science parks* exists in bustling urban regions. They are the manifestation of cooperation between economic, academic and government players and the place of operation of organisations participating in global and regional innovation activities (Annerstedt 2006). The declared aim of these parks is *to improve the welfare of the local community,* through supporting efficient cooperation between the above mentioned three types of players. However, a well operating third generation park also offers a broad portfolio of innovation related services, contribute to *the development of their regions' entrepreneurial culture* and establish two-way communication between the creators and users of knowledge and technologies. Using the above as our starting point, these science parks' *innovation approach can be described* with the interactive, feedback-based innovation model. *Their management* is based upon long-term partnership between the private and public sectors. In matters of strategic importance, actors decide together – but the day-to-day management tasks of a third-generation science park are performed by a jointly owned business organisation, which has a professional team of experts.

As the reader can see from the above, the first two generations of science parks were established mainly in cities' outskirts, being, so to say, consciously separated from the region around them, while *third generation parks are an organic part of the urban regions* that give home to them (Annerstedt 2006) and their aims are not shaped to suit only a small group of players (Table 2). First-generation parks, which were exclusively built upon universities' needs and opportunities, were replaced by third-generation parks, which were more tightly suited to the opportunities and needs of their region. The initial "science push" approach was replaced by the organisation of parks along the interactive model. And with this interactive model in place and use, focus is no longer on aggressively pushing the results of universities, knowledge-creation institutions into economic utilisation: the game is now about innovation activities that are based on two-way knowledge and information flow between the players participating in the process. And the achievable level of success of interaction depends on the potential number of relations, which, owing to the higher level of concentration of players able to be involved in innovation processes, can, in turn, also be higher. And this higher level of concentration of these players is more likely in the proximity of universities. In summary, universities continue to be the key players of science parks – but the parks' *level of success now requires cooperation between the different players of their broader environment.*

Table 2. Comparison of the three generations of science parks

Aspects	First generation	Second generation	Third generation
Aim	broaden universities' economic opportunities	support the creation and growth of innovation oriented businesses	improve the welfare of the local community
Mechanism of operation	economic utilisation of the university's research results	create technologies suitable for economic utilisation encourage university students to become entrepreneurs	support A-I-G relations and interactions offer a broad portfolio of innovation services develop the region's entrepreneurial culture
Location	in the immediate proximity of the university but not in the city centre	not in the city centre	in bustling city centres
Started by	mainly universities	primarily business organisations, the minority by universities	universities, businesses and local (municipal) government together
Management	organisation created by the university	a business created by the private sector, the public sector has a smaller say	a business jointly owned by the three sectors With a professional management team
Innovation approach	science push	market pull	interactive, feedback-based

Note: A-I-G = "academic-industrial-governmental"
Source: Edited by the authors, based on Annerstedt (2006)

3. The Engaged and Entrepreneurial University Models

As the previous chapter describes, universities play a leading role in the organisation of each of the three generations of science parks. Science parks, however, are only the means and not the end of the economic development scenario related to knowledge creating institutions / universities. What role universities play in the shaping of their local economy and what background logic they work along are, thus, of fundamental importance: these aspects also determine what role universities play in the organisation of science parks, in the dissemination of the idea of 'responsible innovation' and the linking of these two concepts.

To its region, a university can appear as a *unique resource,* owing to its numerous impacts on and relations with its environment. This economic and social involvement, however, has not always been so common. Such institutions used to perform only higher education tasks and were a lot fewer in number. For these reasons, they used to have a weaker relationship with and much less influence on their local economy, compared to the modern universities of our days. With their research functions appearing, a somewhat tighter relationship began to form between the aca-

demic and industrial sectors – but even that was by no means a consciously managed process.[4]

Almost up until the end of the 1980'-s, the view ruled that universities' education and research activities ought not to be put under any financial limitation, whether or not they bring any economic benefit to society (Breznitz–Feldman 2012). However, due to the fact that most such institutions were financed from government budget, this approach began to be problematic and there was *a growing expectation that the academic sector should generate some profit for society* (Goldstein 2010).[5] With the economy starting to become knowledge-based, this expectation grew even stronger – both from the government and the private sector. Simultaneously, as government budget sources started to peter out, universities became motivated to more actively seek relations with players of the economy, with an eye to obtaining additional sources to finance their operation (Benneworth–Hospers 2007), and to consciously take part in the shaping of their region's economy and society (Goldstein 2010).[6] And these processes led to the birth of new functions for modern universities, mainly characterised by the *encouragement of interactions with economic and social players, in order to strengthen the direct economic and social impacts of the original activities,* the output side (Bajmócy 2005). This aim is described in professional literature as the *"third mission"* of universities. Universities started to complete this new mission along two different models, which can be of fundamental importance from the point of view of translating the concept of responsible innovation into the practical operation of science parks:

1. the engaged university model;
2. the entrepreneurial university model.

As the role of universities in the development of the local economy was broadening – in the *engaged university model* – new functions started to appear, in addition to the traditional education and research functions: knowledge transfer, participation in the development of policies and other economy-related initiatives by these institutions (Table 3) (Breznitz–Feldman 2012). Under the *"knowledge transfer function"* umbrella concept, the two authors collect classic third-mission activi-

[4] It is since the appearance of research functions that universities can be considered so-called "modern universities" (Goldstein 2010). Public opinion is that the first modern university model is the Humboldtian model. The primary goal of these universities is elite education and their main motivation is to achieve academic excellence – without any conscious practical approach to the utilisation of the knowledge researched and transferred and with a relatively high level of freedom in finances and operation.

[5] This basic idea contributed to the appearance of the so-called 'engaged university' model.

[6] The entirety of the processes described – supplemented with the changes in regulations on intellectual property – resulted in the birth of the 'entrepreneurial university' concept. Though this has a number of overlaps with the 'engaged university' model, Goldstein (2010) identified a number of fundamental differences between the two models.

ties, which have direct impacts – including both formal (licence sales, spin-off processes) and informal (flow of knowledge through university students and relation networks) mechanisms. Within these, two subcategories are distinguished: one is the sale of technologies, the other is the provision of business services.

Over and above the direct business utilisation of knowledge and technologies, universities can contribute to the development of their environment in other, indirect, ways (Breznitz–Feldman 2012). Since they have a very broad knowledge base and are usually among the largest employers of their region, they also play an important role in *policy development,* to which they contribute with different economic research programmes and policy related recommendations. This function can incorporate the popularisation of the responsible innovation concept among stakeholders. Besides these, *their other initiatives influencing the (local) economy are neither to be forgotten about,* of which their role in workforce development, partnership building and real estate development deserve to be mentioned (Table 3). The essence of 'the engaged university model' can be identified as harnessing university knowledge and resources for the improvement of the prosperity of the local community and economy (Goldstein 2010) – which, in itself, requires a higher level of responsibility in operation.

Table 3. Details of universities' new functions in the engaged university model

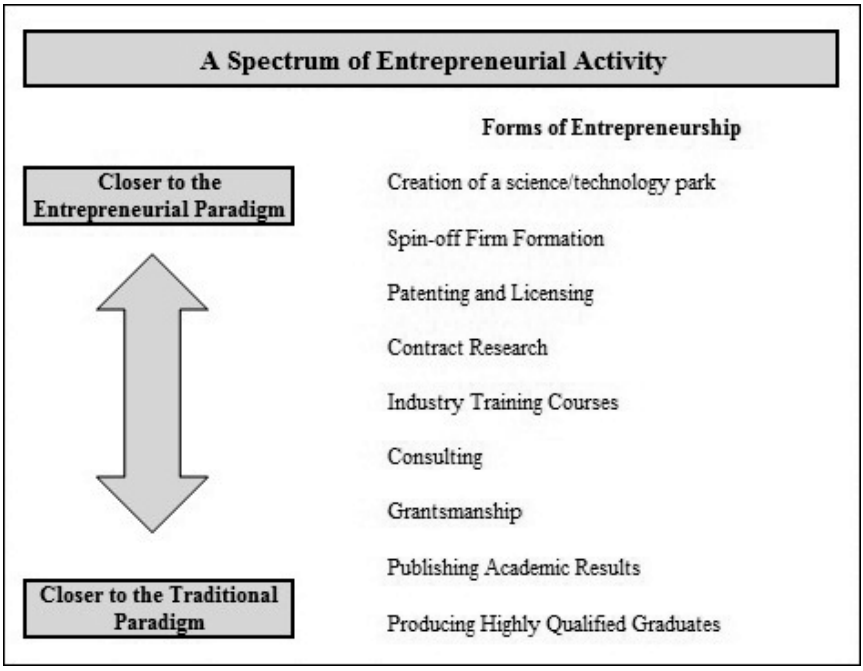
University role	Program	Characteristics
Knowledge transfer	Technology commercialization	Patents, licenses, and spinout companies transfer knowledge from the university to private sector
	Business assistance	Assistance in business education, the writing of business plans, and assistance with facility
Policy development	Economic development and policy research	Research conducted by university faculty and students provided to state and local government/s
	Policy recommendations	Using faculty expertise and research to provide policy recommendations on a variety of issues important to the economic base of the region
Economic initiatives	Workforce development	Programs to provide new skills or employment and education in workers' rights and compensation
	Partnerships	Connecting different stakeholders to the region in order to promote local economic success
	Community development	Improving local business growth and neighbourhoods through entrepreneurship
	Real estate development	Improving both residential and business (science parks, incubators) real estate in adjacent neighbourhoods

Source: Breznitz–Feldman (2012, p. 145)

Universities' third mission activity, i.e. the targeted utilisation of knowledge impacts for the boosting of the (local) economy, ought to be examined also through the *entrepreneurial university* concept: this approach can play an important role in

the practical dissemination of responsible innovation in practice. The essence of the 'entrepreneurial university' concept is that active contribution to regional and national economic performance and promoting institutions' financial success (Etzkowitz et al. 2000) are made part of universities' set of goals and, to this end, universities get involved in a broad portfolio of entrepreneurial activities (Chart 1). Similar ideas and activities also exist in the *engaged university model.* However, while for the latter the driving force of these activities is some kind of inner drive for *refunding or compensation to society* due to operating from public funds, in the case of the *entrepreneurial university, entrepreneurial motivations are more dominant* (see promoting institutions' financial success) and focus is also more on activities that support the achievement of this aim.

Chart 1. Forms of universities' entrepreneurial activities



Source: Philpott et al. (2011, p. 162)

Philpott et al. (2011) arranged universities' entrepreneurial activities along two dimensions. *Activities closer to the entrepreneurial paradigm* (creation of science parks and spin-off companies, patenting and licensing activities) have some tangible results and are more characteristic of mature entrepreneurial universities, while *activities that are closer to the traditional paradigm* (supply of qualified workforce, publication of results, acquisition of research grants) are more in line with such institutions' traditional missions and provide less tangible results. The

concept of responsible innovation is connected more closely to activities that are closer to the entrepreneurial paradigm as it is these activities that are nearer to the end of the innovation chain, i.e. utilisation on the market. Accordingly, universities can influence the widespread dissemination and successful practical implementation of the responsible innovation concept through their entrepreneurial activities.

4. Responsible Innovation in Science Parks

Through their functions described above, science parks, being the spaces of innovation, can do a lot for the translation of the responsible innovation concept into tangible practice. They collect a region's main research and innovation results, gather players needing similar knowledge elements, stimulate two-way knowledge flow (Link 2009) and enhance university students' chances for local employment, i.e. the local utilisation of special expertise. And this kind of innovation spirit can clearly play a role in adopting the practice of responsible innovation. It seems from the above that the primary roles of science parks are the collection of players (supporting the creation of knowledge intensive businesses and attracting such organisations to the given region) and the facilitation of innovation processes (stimulating businesses' innovation activities). However, the creation of new and the channelling of existing knowledge depends first and foremost on the members of science parks and, among them, primarily on universities. In summary, the concept of responsible research and innovation can be carried over to the operation of science parks and, through them, going forward, into the wider region's attitude, with the assistance of universities.

The results of studies on connections between universities and science parks scatter over a very wide range (Vedovello 1997, Hansson et al. 2005). However, none of the studies on this topic states that these connections could be ignored. Moreover, in our opinion, *it is exactly the network of relations with universities that to a great extent determines the successfulness of science parks.* As their innovation approach gets more sophisticated ("science push" being replaced by "interactive"), the efficient operation of these connections is even more strongly needed. At the same time, the nature of these relations should be clearly understood: in most cases, the main attraction to businesses is highly qualified human resources (Andersson et al. 2009) or informal relations, rather than contracted research projects or technology transfer contracts (Vedovello 1997). The spreading of novel ideas like RRI can be achieved not only as a result of universities' direct economic impacts (spin-off creation): more indirect mechanisms related to the economy (workforce development) can also play a significant role.

We ought neither to forget that science parks are *nothing more than means* to intensify universities' output-side impacts and, in turn, to contribute to the development of their region. Consequently, *the profile and level of development of a univer-*

sity can be a decisive factor in the successfulness of a science park. It makes a huge difference what field of science the institution with which the park and its businesses cooperate excels in. Base and applied research results achieved in engineering, IT, life and natural sciences are more important for the success of a science park than the performance of other fields of science (Perkmann et al. 2013). This is especially important from the point of view of responsible innovation because the majority of innovations that radically transform our everyday lives are born mainly in these areas – and, as a result, the circumstances affecting the geographical concentration of the businesses of these fields of science can also have more widespread impacts. Consequently, with a consciously managed RRI policy, science parks can be truly powerful focus points of the efforts made for responsible innovation – in which universities, being opinion leaders, take the key role.

Besides all these, there may exist a number of *internal restrictions* at universities that can potentially impede the formation of relations between these institutions and science parks/economic players. If a university lacks the commitment or motivation to support researchers'/students' business activities or if the university lays a higher emphasis on international research relations than on participation in local partnerships (Benneworth–Hospers 2007), science parks, no matter what efforts they make, will not be able to play the role expected of them. In other words, parks – being the collectors and receivers of university outputs – to a great extent depend on the university's successfulness, profile and third-mission activity. This also shows that universities play a key role in determining the extent to which responsible innovation gets manifested in a given science park's innovation practice.

It is obvious from the above that science parks, being the holders of innovation results, can play a crucial role in the dissemination and practical application of the European Union's flagship initiative, the theory of responsible innovation. We can establish that this logic is in no conflict with the framework system of all three generations of science parks or the different university models. The differences between these generations can be identified in the leaders of RRI efforts, the motivations of innovators and the dominant third-mission operating mechanism of the universities involved (Table 4).

In first and second generation parks, RRI efforts are led by the university, which also operates as such parks' scientific base. These parks do not yet have the multidimensional initiative and leadership which can already be observed in third generation parks. As a result, the first two generations of science parks can encounter the concept of responsible innovation primarily through the university's scientific base: universities can have a significant influence on science parks' members not only in the field of technology innovations but also in the dissemination of novel concepts. Consequently, the motivations of a park's innovators to learn and adapt the concept of RRI are not internal but external ones. And, in such parks, all this can result in a scenario in which the RRI concept does not get integrated into the play-

ers' everyday operation – rather, the focus is on meeting minimum requirements. For this reason, responsible innovation can also appear in the selection policy.

Table 4. Manifestation of RRI efforts in the different generations of science parks

Aspects	First generation	Second generation	Third generation
Leader in RRI efforts	university	university	University, management businesses, government
Innovators, motivation for the practical application of the RRI concept	meeting university expectations	meeting university expectations	General attitude, internal motivation, meeting university and partner expectations, positive image
Dominant university model	entrepreneurial university (activities closer to the entrepreneurial paradigm)	entrepreneurial university	engaged university entrepreneurial university

Source: Edited by the authors

By contrast, third generation science parks, which are a more deeply integrated part of their region, set the aim of improving the welfare of the local community – which cannot be limited to merely improving the financial standards of life. In this scenario, aspects other than financial matters (e.g. the improvement of efficiency resulting from innovations should not lead to a drastic decrease in employment or, if so, the company should have a predefined plan to handle such a situation) can get taken into account in the course of innovation processes, as the players' internal motivation, explicit or implicit. This is also supported by the change occurring in the third generation's innovation approach. While in the linear innovation process relations between players are practically one-way ones and are usually dominated by one of the two parties, the interactive innovation approach enables the timely detection and management of any negative impacts of innovations, through feedbacks. Owing to the players' mutual dependence and continuous communication, RRI efforts are initiated not only by the academic sector but by a wide range of players connected to the science park. In the case of third generation parks, an additional motivation can be the fact that RRI may be a positive differentiating factor for the innovator – and this positive image can also promote the diffusion of the concept within the park.

Science parks' different generations also differ in how universities' dominant third mission operates. While in the first two generations there are more universities that operate along the entrepreneurial model, the third is dominated by the engaged university model. In the beginning, parks functioned as the point of collection of universities' research results – as a kind of extension of the university structure – and that required entrepreneurial activities also on behalf of universities. Conse-

quently, in this type, promoting RRI was also a part of universities' entrepreneurial activity portfolio (in certain cases, this is integrated into the selection policy of the science park created by the university). The third generation, however, is characterised by the engaged university model, in which both the park's players and the university work for the development of their wider territory – which requires the broadening of the set of intervention tools (e.g. policy recommendations for a particular RRI or education about the RRI concept and its carryover to the park through the workforce educated on the matter). Simultaneously, however, solutions typical of the previous science park generations may also continue to exist. Simultaneously, solutions typical of the previous science park generations may also continue to exist.

5. Summary

Science parks and responsible innovation are very close to each other both as regards their theory and their practical application. Since science parks collect a given region's research and innovation results and players, their connection to the concept of responsible innovation is a very current theoretical and practical research topic.

In this area, special attention should be paid to the role universities assume in this scenario as it can be clearly proven that universities play a very important part in the operation of a given science park, independently of the type of that park. This university-science park relation network had better be examined with the role that universities play in economic development also taken into account – and, within that topic, the entrepreneurial university and engaged university functions deserve special attention. In both cases, we can identify the roles through which universities can promote the theoretical and practical application of the 'responsible innovation' concept in the park.

Universities can perform these activities in all the three generations of science parks – the difference being that in the first two generations of parks it is almost only and exclusively the university, as a scientific base, that can "orientate" the park's new members towards RRI, in third generation parks, other, sometimes internal, motivations can also be identified.

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