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## How to Control University Subsidiaries – the Management Approach of Graz University of Technology

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### Abstract

*Universities are forced to exploit their research results and Intellectual Property Rights (IPRs). This means, that universities have to participate in spin-offs and research enterprises and also to manage them professionally. This leads to the question, how specific management tools can help to make university spin-offs and research subsidiaries successful and sustainable. This article introduces a theoretical framework which is adopted to universities spin-offs and competence centres and shows exemplary the implementation and management approach of Graz University of Technology.*

**Key words:** *competence centres, management control system, university spin-offs, university's subsidiary management*

## 1. INTRODUCTION

In the context of the Austrian University Law 2004, universities got autonomy and also the responsibility to make use of their research results and connected intellectual property rights. This leads also to support university related spin-off companies. An Austrian research support programme provides establishing research companies in cooperation between universities and private companies, so called „Competence Centres“.

In the meantime (as of Sept. 2015) Graz University of Technology (TU Graz) is holding shares in 18 companies (the “portfolio of subsidiaries”) with 12 competence centres, one university incubator and five other companies among them. The turnover 2014 was about 98 million Euro, and nearly 1,100 people are employed today.

Therefore TU Graz is eager to manage these subsidiaries in a professional way, also to reduce comprised risks. TU Graz established an internal portfolio management, oriented strategic and operational. Practical establishment was accompanied by a PhD-thesis, which „should lead to a model of a subsidiary management control system of universities including critical success factors and expectations from a university point of view“ (1).

According to this, this contribution first introduces a theoretical explanatory model and secondly describes the practical implementation at TU Graz based upon its management approach.

## 2. THEORETICAL BACKGROUND

### 2.1 University's subsidiary life phase model

In general, university spin-off companies (USOs) differ from other spin-offs in attempting commercialisation of research, conducted by universities researchers. Usually universities lack in resources and academic entrepreneurs may lack in commercial skills and attitudes. Another problem is that stakeholders like universities, researchers and academic entrepreneurs and suppliers of funds often have different interests and objectives. The literature reports that the influence of human motivation has also important implications on a successful implementation of a new intention (2).

Vohora addresses these issues in a model, showing the organisational characteristics of USOs and the critical junctures in the development of USOs (3).

In Austria, there are different types of university subsidiaries. First we have spin-off companies (USOs) which are founded by researchers and students from the university. The second type are research companies, especially so-called competence centres. These companies are financed by a public national research fund (COMET Competence Centres for Excellent Technologies). Whereas USOs directly pursue commercial market success by exploiting research results, the core business of COMET centres is focused on application oriented research. From the first idea to a sustainable business they run through

different life phases with different management requirements. Psutka offers a framework for designing a management control system which respects the life phases of the company and the corresponding management activities (4). These activities are the

operational management part of a management control system which also has to respect the strategic planning level. In figure 1, Psutka's framework is complemented by the life phases of competence centres.

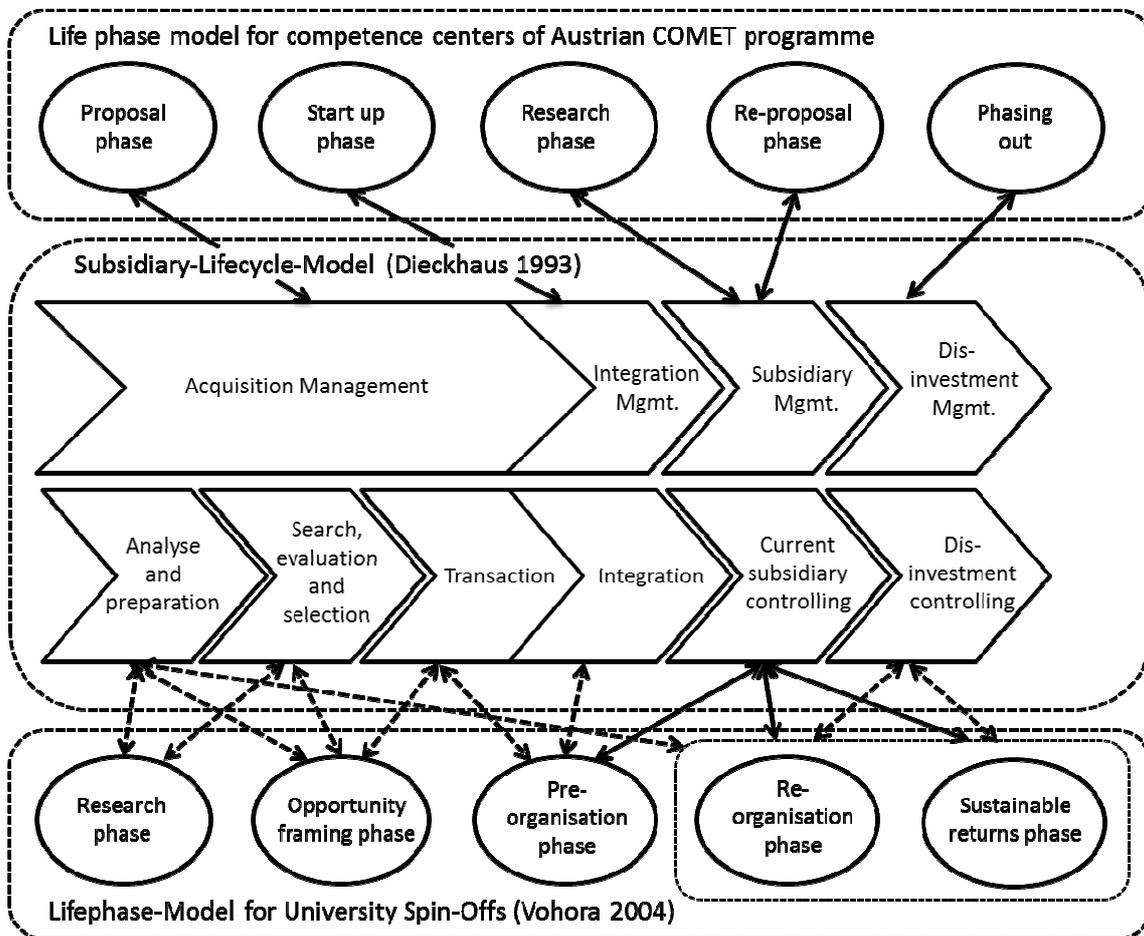


Figure 1. Life phase model of university subsidiaries (4; complemented)

The following chapters describe briefly the main parts of the model.

**2.2 Life phase model for university spin-offs (USOs)**

Vohora identifies five phases with specific activities the USO-company must accomplish before it can move to the next phase of development (5). These phases are:

**2.2.1 Research phase**

„...the main focus for all the academic entrepreneurs (or academic innovators), prior to the commercial opportunity being recognized, was on perfecting academic research and publication of the work towards a particular scientific community“, Vohora stated (6). Publish or perish is usually the mind-set of academic researchers. Within this phase, also intellectual property rights are created.

This includes the potential opportunity for commercialisation and founding a company. The critical juncture to make the step into the next phase is to

recognise the opportunity to fulfil the market needs with a solution that satisfies the needs.

**2.2.2 Opportunity framing phase**

Now it is important to evaluate the technological validity, performance and its commercial opportunity. The result is a valid business plan. The critical juncture to step into the next phase is the entrepreneurial commitment. This commitment is necessary to take a venture from a vision into operational business.

**2.2.3 Pre-organisation phase**

This phase comprises commercial exploiting and implementing strategic plans. It includes decisions for developing and acquiring know-how and knowledge. Vohora stated that this „phase represents the steepest learning curve for the academic entrepreneur“ (7), because he has no commercial experience or knowledge.

The critical juncture is credibility to carry out the venture to a fully operational business.

### 2.2.4 *Re-orientation phase*

The entrepreneurial team has to learn how to develop resources, knowledge and assemble new capabilities. This also means to re-configure them. The critical juncture is to gain sustainable returns from the customers.

### 2.2.5 *Sustainable returns phase*

Usually in this phase, the USO moves off from the university campus into a commercial environment. The enterprise has established its own commercial identity. Usually it keeps a close link with the University.

## 2.3 **Life phase model for competence centres of the Austrian COMET programme**

Whereas USOs are expected to “take off” from the university campus, competence centres are established for bridging gaps between academia and economy within certain technology fields and for certain time spans. As they are focused on application oriented research, COMET centres depend on external funding both from the public and from industry partners as well. Universities are obliged to contribute five percent to the centre budget, too. There are two programme lines for competence centres within COMET:

- The **K2 centres** are the very large centres. Only five have been funded in Austria until now. Their aim is to gain international visibility by bundling existing national expertise in the long-term and collaborating with the world's leading researchers, scientific partners and company partners in joint strategic research programmes at highest level.
- The objective of **K1 centres** is the initiation of high-quality research defined jointly by science and industry with a medium-term to long-term perspective. K1 centres implement top-level research with a focus on scientific and technological developments and innovations to qualify for the future markets.

Competitive calls decide whether a competence centre is installed for a duration of eight years, respectively whether it can be continued for an additional funding period. Hence, typical life phases of competence centres are:

### 2.3.1 *Proposal phase*

Triggered by funding calls, proposals for competence centres are generally elaborated at universities and other research institutions in cooperation with key industry partners. The proposal comprises the planned research programme for the first four years as well as the planned governance structure like the shareholders and the governance bodies of the limited liability company to be founded.

### 2.3.2 *Start-up phase*

As soon as the consortium gets the funding acceptance, the COMET centre is built up: i) foundation of the Ltd. company, ii) establishment of the contractual

framework for the research programme, iii) recruitment of personnel and acquisition of premises and equipment, iv) establishment of rules and business processes.

### 2.3.3 *Research phase*

After the “phase-in” of about one to two years, the larger K2 centres expand to annual COMET budgets of around 12 million Euro and to around 150 full-time equivalents of employees. K1 centres reach a dimension of around 5 million Euro annually and 60 FTEs of personnel. Besides carrying out the joint research programme together with their scientific and industry partners, the centres are challenged to build up a “Non-COMET area”; an area where further research shall be acquired at the “market” comprising both publicly funded projects and projects directly contracted with the industry, and being leveraged by the created competence in the basic centre programme.

According to target values agreed upon, the performance of the centres is controlled by the funding agency utilizing reporting routines and periodic evaluation events.

### 2.3.4 *Re-proposal phase*

Still in overlap with the research phase, the early preparation of an ambitious consecutive research programme in line with the centre strategy is most relevant for safeguarding the opportunity for a continued competence centre.

### 2.3.5 *Phasing-out: re-engineering or liquidation*

Centres not being successful in the competitive follow-up calls are granted a phase-out period of one year with already reduced budget. During this time strategic decisions must be taken whether the centre shall be continued by only the Non-COMET activities (including re-dimensioning the company) or shut down.

## 2.4 **Different management areas and activities**

The different phases both in university spin-offs and competence centres as well need focused university management approaches for acquisition, integration, going concern and disinvestment (8).

### 2.4.1 *Acquisition management*

In the subsidiary lifecycle model, the acquisition phase is the period of either founding a new enterprise or acquiring an already existing external company. For evaluating a potential subsidiary, it is helpful that universities are consequently tracking their portfolio.

The first activity is to analyse the critical strategic success factors and prepare the decisions to create success potentials. This includes establishing a portfolio policy and a portfolio strategy and to deviate targets.

The next activity is to search or monitor, evaluate and select spin-off projects and competence centre initiatives on the basis of defined criteria.

Transaction is the planning activity of determination actions to integrate the company into the university structure. Elaborated key documents like business

plans, risk-reward assessments and integration plans are the basis for final acquisition decisions by the university boards and for the subsequent integration activities as well.

#### 2.4.2 *Integration management*

In this phase, the company is definitely integrated into the company portfolio of the university. The procedures of integration have to be based on critical success factors, e.g. the extent and quality of collaboration between the portfolio company and university institutes, the selection of university representatives for subsidiary boards, the adoption of reporting guidelines, the integration speed etc.

An important duty of a portfolio management control system is to accompany and support the integration process.

#### 2.4.3 *Subsidiary management*

Subsidiary management includes operational daily business, such as collecting information, evaluate information and management reporting. This needs a management control system which supports decision-makers. The results are decisions and measures based on this information. The main goal is to ensure that the subsidiary is successful in a sustained development. Basis of a stable and sustainable running business are effective customer relationships. So „...the ability of a firm to create and maintain relationships with their most valuable customers...“ (9) is an important competitive advantage, also for USOs and competence centres. Therefore, it is essential that added value is especially gained for the university, not only or even not at all by a financial surplus, but by additional scientific outcomes.

#### 2.4.4 *Disinvestment management*

Disinvestment from a shareholder's point of view means either closing-down a portfolio company or leaving a portfolio company and selling the university shares.

The reason for a close-down can be that the period of public funding ends or simply having economic troubles. Stepping back from being a shareholder in a further ongoing company may be caused by insufficient collaboration with the university or by strategic mismatches like a change from research activities to commercial activities (industrial development or consulting services) not being the core object of universities. These strategic changes are usually triggered by the termination of public funds. It is the task of each university to define until when it stays on board of commercial business activities and to which extent the university is willing to carry business risks as a public institution.

Another variation of disinvestment appears in its partial execution: not closing down the company, but reducing it to a minimum level of activities in order to preserve the opportunity for a re-start, by stepping into a possible new acquisition phase when the actual constraints have diminished.

In case of managing portfolio company liquidations, disinvestment plans need to be generated, contract negotiations and operational management to be done.

Questions, whether company resources – especially personnel – can be transferred to the university or not, must be solved. The target is to prohibit negative impacts in every sense.

### 3. DESIGNING THE CONCEPT FOR MANAGING THE COMPANY PORTFOLIO

#### 3.1 Requirements from practice

In late 2007, when TU Graz assigned the second co-author with establishing an active portfolio management, TU Graz already held a portfolio of more than ten ongoing companies, most of them being competence centres. Hence, most of the practical requirements resulted from issues of better integrating and daily managing the company portfolio. The key tasks were defined as follows:

- Determination and periodic adaption of TU Graz' strategic objectives for the company portfolio
- Clear organisational responsibilities for each portfolio company
- Differentiation between research-oriented and service-oriented portfolio companies
- Better co-ordination between rectorate and TU Graz representatives in general assemblies and supervisory boards
- Better flow of information (portfolio monitoring and regular reporting towards rectorate and university council)
- Financial monitoring and controlling of portfolio companies (four-eyes-principle)
- Active control of company developments, in order to:
  - better push strategic interests of TU Graz and its co-operating institutes,
  - enhance research co-operation between TU Graz and the portfolio companies, both in scientific and financial matters.

#### 3.2 First generic approach

Besides meeting the requirements from practice by organisational measures, the first approach was to find strategic pathways for the already existing and operating subsidiaries by determining their location in a two-dimensional portfolio (figure 2).

This was the first attempt of getting a common view and of how to cope with a pretty heterogeneous company portfolio.

This bird's eye view of partly completely different portfolio companies led us to the question how to organise our portfolio management rules and procedures as homogeneously as possible.

Hence, we realized that our approach should take into account more dimensions and consider different types of portfolio companies. Especially it should follow a certain hierarchy from agreeing on basic principles (portfolio policy), defining strategies (portfolio strategy) down to operational targets and administrative processes.

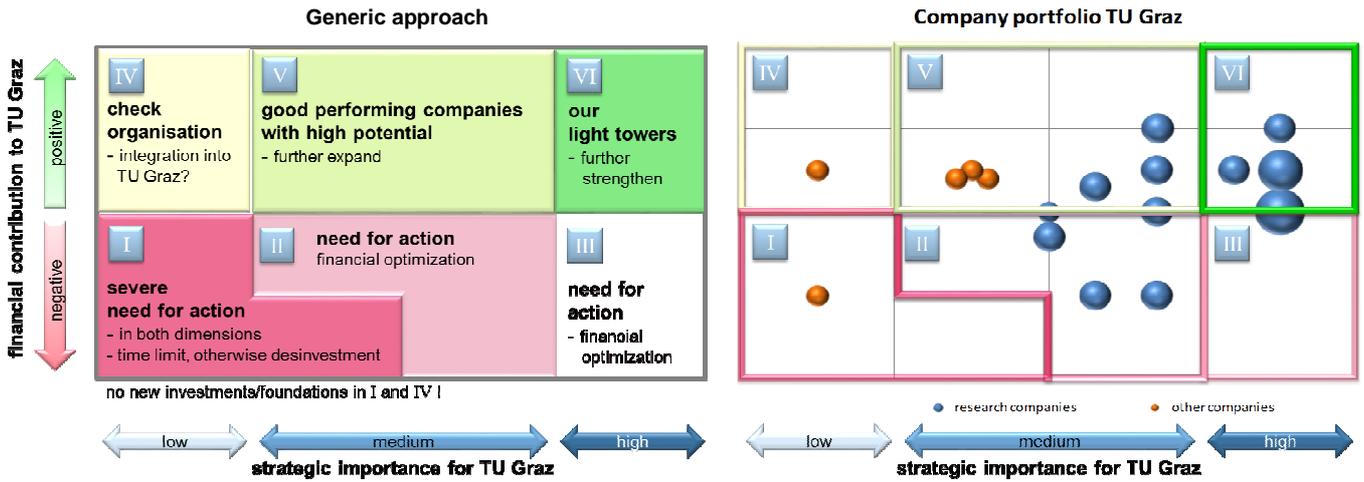


Figure 2. Deduction of strategies from current status of subsidiaries (first: generic approach, second: TU Graz portfolio in 2009)

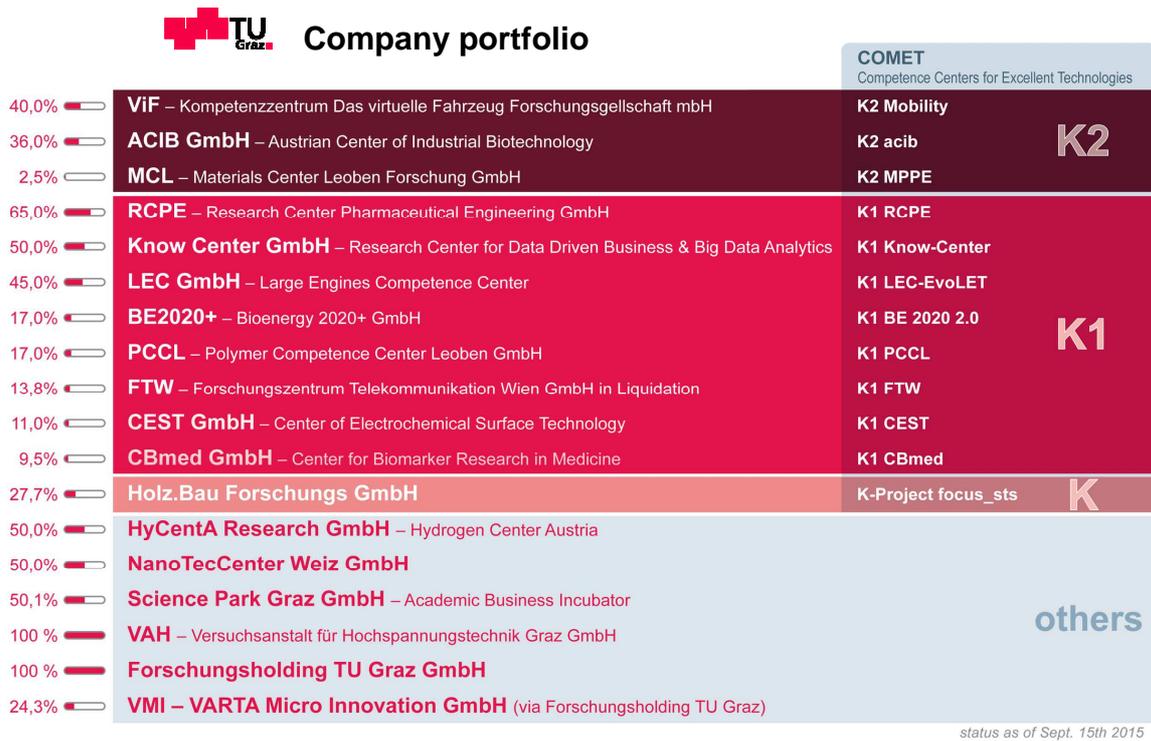


Figure 3. Company portfolio of TU Graz including shares and relation to COMET programme (as of Sept.2015)

### 3.3 From policy to operational management – the hierarchical and incremental concept

A consistent management concept had to be developed to meet day-by-day's requirements in managing a portfolio with nearly twenty companies in the meanwhile (figure 3).

Due to restricted human resources, the organisational design process was – and still is! –

an incremental one. New developments were implemented step by step, often influenced by actual incidents like re-engineering projects, company crises, acquisition processes, too. Nevertheless, it was of crucial importance to follow the hierarchical path: from policy to strategy to targets to operational processes.

## 4. INCREMENTAL IMPLEMENTATION OF THE HIERARCHICAL CONCEPT

### 4.1 The portfolio policy

The baseline was set by implementing the portfolio policy which includes two basic objectives:

- Scientific output like publications, patents etc. is the primary driver for TU Graz to invest in (research) portfolio companies. Especially, the COMET funding programme for Austrian competence centres requires the foundation of limited liability companies. Thus, TU Graz as an active player in research cooperation with the industry strives for holding shares of these COMET centre companies to generate scientific output.
- TU Graz is not eager to earn money with its research company portfolio, but each subsidiary must follow the 'going concern'-paradigm and hence do a good business job.

Besides these basic objectives, guiding principles like four-eyes principle or minimisation of risks and liabilities were defined. Furthermore, the organisational frame was determined, e.g.:

- investment and engagement levels depending on different roles of activity like lead or co-lead function within a consortium,
- reporting needs for investment and disinvestment decisions of the rectorate and university council.

### 4.2 The portfolio strategy

From 2011 to 2012, the portfolio strategy was conceived. It covers the portfolio mission and the portfolio vision as the back-bone of how TU Graz sees its portfolio and how TU Graz wants to develop its interactions with its affiliated companies in the long run (figure 4).

The strategy document involves four different types of portfolio companies:

- competence centres and research companies
- university spin-offs
- networks
- service companies

The competence centres and research companies form the core of the portfolio. Most of the portfolio companies belong to this category. However, workshops were carried out within the strategy process for each of the four categories. We undertook SWOT analyses, by which we derived strategic options by TOWS matrixes and finally determined strategic targets including how to achieve them.

Helping in every day's life in portfolio management, basic strategic decisions were taken, e.g. by defining the activity paths regarding university spin-offs.

The ambition for generously supporting entrepreneurial actions was underpinned by the document. It also clarified that TU Graz itself is not eager to jump on the board of owners of start-up companies, which was due to the fact that TU Graz as a public institution is not allowed to assign funds to venture capital activities.

**Mission** – what's important for us with regard to our affiliates?

- TU Graz is Austria's leading university in research cooperation with the industry (from basic research till industrial innovation).
- We are an essential driver for innovation and focal point for the foundation of companies.
- We regard our affiliated companies as valuable instruments in order to achieve our objectives of an active research collaboration and knowledge transfer for technological progress in our region.



**Vision** – what are we aiming at on the long run with regard to our affiliates?

- TU Graz and its affiliated / associated companies are complementary in their core activities. They permanently support each other in their further progress.
- The affiliates significantly contribute to the scientific fingerprint of TU Graz and support TU Graz to be among Top-10 universities in Europe in its fields of excellence.
- Promising research results are actively transferred in society and economy. TU Graz is generator and guarantor of a lively innovation and founders' scene. Spin-offs from TU Graz are an important path of technology transfer. TU Graz therefore supports founders in starting-up their businesses and benefits on the long-run – mainly from research collaborations in the future. Getting on board as a shareholder is possible for TU Graz, but has no priority.

Figure 4. Mission and vision of TU Graz portfolio strategy

### 4.3 Operational portfolio management

On the operational level, the core process of actively representing TU Graz in the bodies of the limited liability companies was considerably enhanced since TU Graz established the portfolio management function as a rectorate staff unit, supported by the colleague from portfolio controlling.

For each meeting (around 85 meetings in total every year), portfolio management unit and portfolio controlling assist and support TU Graz' representatives.

They meet in advance to the board meeting for a preliminary talk (around 1 hour) and afterwards for a short debriefing (half an hour), allowing for a sustained information flow on the outcomes of the meeting and for discussing further steps (figure 5).

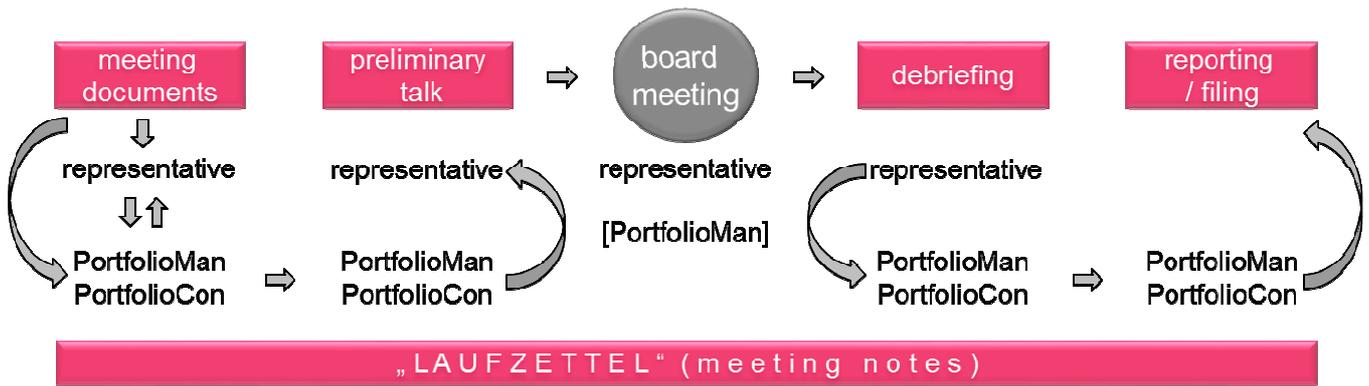


Figure 5. Supporting TU Graz representatives in meetings

The “Laufzettel” (meeting note). Portfolio management unit and portfolio controlling analyse the meeting documents, condense the agenda with the most important issues and open questions into one meeting note document, the so-called “Laufzettel” (figure 6). This document is the main communication instrument between the representatives and the “four eyes” of portfolio management and portfolio controlling.

The “Laufzettel” consists of three parts. The first part is a check list on the completeness and transparency of the meeting documents. General remarks on the reporting structure of the subsidiary can be given in this section. The second part follows the agenda items and covers found problems, questions to be asked, and core information. Finally, the representative is requested to insert the meeting outcome in the right-hand column. The third part of the document is the signature section: The representative in the board and the persons from portfolio management and portfolio controlling initial both at the end of the preliminary talk and after the debriefing as well.

4.4 Portfolio management according to the subsidiary life phase model

Since late 2007, a quite amount of TU Graz subsidiary companies went through the different life phases elaborated in chapter 2. As of Sept. 2015, the 18 current portfolio companies can be allocated to the life phases for competence centres as follows:

- proposal phase / acquisition management ... 1 subsidiary (not yet founded)
- start-up phase / integration management ... 2 subsidiaries
- research & re-proposal phase / subsidiary management ... 12 subsidiaries
- phasing-out / disinvestment management ... 4 subsidiaries
- of which in re-proposal phase ... 3 subsidiaries

As it can be seen, most of the companies are at the stage of ongoing business. However, half of the companies is in a more or less dynamic phase (proposal, re-proposal, start-up, or phasing-out). Looking beyond the current status and observing the period of 2007 to 2015, even more portfolio transactions had to be managed:

- 7 company acquisitions, of which 5 newly founded;
- 11 not realised acquisitions;
- 4 company mergers;
- 7 disinvestments, of which 4 company liquidations and 3 puts of shares;
- around 30 COMET proposal & re-proposal phases.

Beteiligungsmanagement Laufzettel AR 11 – RCPE 28.02.2011			TU Graz
AR 11 – RCPE		Laufzettel	
Datum: 28.02.2011		Mandatarin der TU Graz: VR Kainz	
Checkliste	Rubrik	Fokus	Check Anmerkung
	Planung	Budget, Arb. progr.	-- unterjähriger AR
	Vermögenslage	Bilanz, Kassa	-- unterjähriger AR
	Finanzlage	Liquidität 6 Mon.	✓ Transparenz ✓, inhaltl. siehe 2.
	Ertragslage	GuV SOLL-IST	✓ (1) K: xxxxxx Non-K: xxxxxx <i>prüfen ob Zukunftsprognose</i>
	Projektentw.	K, Non-K	-- S.3: keine 3D-Grafiken X
	Entw. Personal	VZA, m/f	-- S.3: keine 3D-Grafiken X
Organisation	Ges., GF, AR	-- keine Änderungen	
Struktur der Darstellung: ✓...OK --...Verbesserungsbedarf !...fehlt od. keine Transparenz ---...nicht erford.			
TOP	Handlungsbedarf	Ergebnis <i>VR keine Handl., Vertretung durch Themen als Auskunftsgegenstand</i>	
1. Regularien	• Protokoll ... ✓	• ✓	
2. Bericht GF	• S.6 Liquiditätsvorschau: Min. Anfang Feb. ...160k, Anfang Aug. ...185k • S.7 Patentverwertung: Rückflüsse an TU Graz? Projektbeauftragungen? • S.8-17 neue Projekte: TU Graz Wiss. Partner?	• PPS-Geld Feb. eingetroffen • SFG-Geld angefordert • TU Graz beteiligt auch an Weiterentwicklung der Geräte • Hiw-jm (IPPT, ELN) -Wahler	
3. 4YE	• S.20-21 strateg. Projekte: TU Graz Wiss. Partner? • S.22 LOC's 2.FP: o Wann LOC TU Graz? o Anteil TU Graz? o Leistungsanteil 20% für Wiss. Partner erwartet	• Area 1: IPPT, ISH-Brenn • Area 2: ELN (Wahler) • Area 3: Fiskal. Physik (Schumann) • bis längstens 25.05. • Tab. mit letzten AGO nicht verändert: 100% Leistungsanteil	
4. Weiterführung RCPS	• S.24: Abkopplung RCPS von RCPE & vertragl. Regelung?	• verhandelt • VR Kainz wird aktiv für nächste Schritte	
5. Allfälliges	• S.25 Technikum Infield 25: Nutzungsvereinbarung?	• Einverständigung u. Vor-Ort-Besichtigung & Gesprächsprotokoll	
VB am 22.02.2011		NB am xx.xx.20xx	
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Version 01 22.02.2011		Seite 1 von 1	

Figure 6. The TU Graz “Laufzettel”, meeting note document

As already pointed out, the hierarchical portfolio management concept was developed and implemented step-by-step. This incremental design process allowed to permanently incorporate the learnings from practical transactions. Vice versa, as soon as each of the components of the concept (the portfolio policy, the portfolio strategy and the operational set-up and tools) was in place, it facilitated additional confidence in aligned and professionalised portfolio management activities. Particularly by reflecting the actual life phase of each single subsidiary, both strategic decisions and operational tasks as well can now be done on a sound basis.

#### 4.5 Further development steps

The above mentioned hierarchical portfolio management system proves itself both in terms of an active steering of the portfolio and in the prevention of adverse incidents as well. However, it was realised that a comprehensive risk approach could give a better overall picture where to take additional measures. Hence, a portfolio risk management system is currently under way.

One major issue detected within the risk assessment activities should be dealt with in the near future: More and more high-level discussions can be noticed about the future of the COMET competence centre funding programme, even despite being an international benchmark programme of bringing academia and industry together. As most of TU Graz subsidiaries are competence centres, it is of crucial importance for TU Graz whether the centres still get public funds or not. Besides this actual threat, TU Graz has gone (or is currently going) through disinvestment phases of several subsidiaries within the last years. Therefore, a back loop to revising the portfolio strategy and focusing more on disinvestment scenarios is foreseen.

Another back loop to portfolio strategy and its revision seems logical regarding university spin-offs. TU Graz has recently started a strategic project named "Entrepreneurial University". It is expected that issues like i) holding or taking part in venture funds, ii) university activities in crowdfunding platforms or iii) even shareholding in spin offs will influence the portfolio management requirements.

## 5. CONCLUSIONS

Within this article, the path of Graz University of Technology (TU Graz) was elaborated how it coped with its nearly twenty subsidiaries in the past and how it is doing now.

Being active in holding a company portfolio and complementary to its own research efforts, TU Graz pursues success in research and innovation with two different kinds of enterprises. The USOs (university related spin-off companies) are heading towards market success by innovative technologies. The COMET competence centres are focused on bridging academia and industry for excellent outcomes in application-oriented research. At least partly, these two kinds of technology enterprises require different management control systems.

Moreover, each of the portfolio companies are going through several life phases. Based upon existing life phase approaches combined by Psutka (4), this article adds another layer to the model addressing the life phases of competence centres.

In order to meet all the requirements and duties alongside these life phases, it is the major challenge in the practical management environment of the university to provide an applicable organisational set-up. From basic policy issues for the portfolio to strategic pathways and operational settings and instruments, TU Graz has been incrementally developing and professionalising its portfolio management system.

TU Graz is still on its way in doing so. Until now, the emphasis was put on the management and controlling of ongoing current competence centres and their ongoing research phase. From now on, the development efforts of TU Graz are being more and more balanced towards optimising acquisition, integration and disinvestment techniques. Especially for COMET competence centres, phasing-out strategies need to be defined as it is foreseen that public funding will be stopped at not yet known, but closer coming dates. Scenarios for a possible re-integration of (parts of) the centres into the university have to be developed as well as alternative scenarios for liquidation of the centres or for the university's stepping-back from its ownership of the subsidiaries.

On the other hand, new opportunities, new efforts and hence new challenges and threats may arise by the recent strategic initiative of TU Graz evolving to an "Entrepreneurial University".

Coping with all these challenges is supported by a risk management layer currently in development at TU Graz. It goes without saying that the risk approach is needed when a publicly funded university is eager to enter business opportunities in the research, technology and innovation market.

## 6. REFERENCES

- [1] Psutka, S. (2012), „Universitaeres Beteiligungscontrolling“, Verlag der Technischen Universitaet Graz, p.III
- [2] Zunk B.M., Soos J., Uitz I., Denger A., Bader M., (2013), „The influence of human motivation factors on the successful implementation of product life cycle management tools: Explorative findings and managerial implications.“, *Manufacturing Technology*.13(4), pp. 580-586
- [3] Vohora A., Wright M., Lockett A., (2004), „Critical junctures in the development of university high-tech spin out companies“, *Research Policy*,33, pp. 147-175
- [4] Psutka, S. (2012), „Universitäres Beteiligungscontrolling“, Verlag der Technischen Universität Graz, pp.301
- [5] Vohora A., Wright M., Lockett A., (2004), „Critical junctures in the development of university high-tech spin out companies“, *Research Policy*,33, pp. 147-175
- [6] Vohora A., Wright M., Lockett A., (2004), „Critical junctures in the development of university high-tech spin out companies“, *Research Policy*,33, p.151
- [7] Vohora A., Wright M., Lockett A., (2004), „Critical junctures in the development of university high-tech spin out companies“, *Research Policy*,33, p. 157
- [8] Dieckhaus, O. (1993), „Management und Controlling im Beteiligungslebenszyklus“, Bergisch-Gladbach, Köln
- [9] Zunk B.M., (2013), „Ideal-typical competence profile of industrial buyer-seller relationship controllers in technological firms – empirical evidence from Austria“, *International Journal of Industrial Engineering and Management*, 4(2), pp. 87-94

# Kako na nivou Univerziteta vršiti kontrolu zavisnih instituta – iskustvo Tehničkog Univerziteta u Gracu

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## Rezime

*Univerziteti su primorani da iskoriste rezultate svojih istraživanja i prava intelektualnog vlasništva (PIV). To znači, da univerziteti treba da učestvuju i pomažu u istraživanju njegovih pojedinačnih članova, kao i da im savetima pomažu u profesionalnom upravljanju. To dovodi do sledećeg veoma važnog pitanja, kako specifični menadžerski alati mogu biti od pomoći da se obezbedi dugoročan održiv razvoj Univerziteta i njegovih članica. Ovaj članak predstavlja teorijski okvir koji je usvojen na Tehničkom Univerzitetu u Gracu.*

**Ključne riječi:** odgovorni centri, upravljački kontrolni sistem Univerziteta