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**Article**

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Andreas Hilbert, Karoline Schönbrunn, Sophie Schmode\*

## **Student Relationship Management in Germany – Foundations and Opportunities\*\***

The objective of the article is to introduce to the topic of Student Relationship Management (SRM) in Germany. The concept has been derived from the idea of a Customer Relationship Management (CRM), which has already been successfully implemented in many enterprises. Its objective is to canvass for customers, obtain their loyalty towards the company and, if necessary, win them back. Furthermore, potential uses of a SRM within the context of Higher Education Management will be demonstrated by means of examples of German universities and by applying new methods.

Key words: **Student Relationship Management, Customer Relationship Management, Higher Education Management, Data Mining, Student satisfaction**

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## 1. Motivation

Students in Germany became more and more demanding. At the same time, the motives of high school graduates to choose their study place(s) have changed over the past years. The German university-information-system HIS ascertained that 65% of the first-year students decided to choose their university due to their place of residence and/or the “hotel mummy“. Good equipment of the university is an important criterion for 58% of high school graduates, as well as the reputation of the university (52%). Nevertheless, for 90% of the high school graduates it is above all important that the courses offered correspond to their specialized interests (Heine et al. 2005: 193f).

Furthermore, the use of information offered by university rankings becomes more and more frequent. However, not only German but also foreign students select German universities on basis of the results of university rankings which are available in English as well. Therefore, it is not amazing that faculties with good ranking results register more students in the following term – in relation to the previous years. However, neither the university management nor education politicians are aware of this competition trend because they associate competition rather with areas of research and professors than with students. Good universities, though, are not only characterized by outstanding researchers but by excellent students as well (Spiewak 2005). Thus it is not astonishing that first approaches to bind potential students to universities are already done by several universities, e.g. by offering workshops for mathematic pupils (University of Munich) or also by “children universities“ (Technische Universität Dresden).

Consequently, the goal of this article is to introduce to the topic of Student Relationship Management (SRM). The concept itself deals with a holistic, systematic care of the “business relationship“ between university and student, whereby particularly the service quality becomes a more and more interesting point (Göpfrich 2002: 97). Thereby, the satisfaction of students can be increased and the commitment between the students and the university will be intensified, also beyond the final degree.

Next to a lasting relation between students and their university, the students’ satisfaction is a crucial factor. Therefore, the general concept of a Customer Relationship Management (CRM) will be defined. Based on this general theory, a model describing the idea of a SRM will be designed. Moreover applicable measures in Management of Higher Education are presented. Furthermore, the intention of the article is to show the potential of SRM by discussing appropriate applications when focusing on increasing the satisfaction of the students.

## 2. Customer Relationship Management as basis for SRM

In order to discuss the possibilities of applying the framework of CRM – as used in the economy – to Higher Education, there has to be a basic understanding of the concept itself. Therefore, definitions of CRM as well as SRM need to be pointed out. Furthermore, three modules of a holistic CRM as well as the framework of a customer relationship lifetime cycle (CRLC), representing the basis of the model proposed for managing university-student-relationships, are to be described in their basic elements.

### ***2.1 Defining Customer Relationship Management***

Many economists have addressed the concept of CRM in theoretic models, which has led to an abundance of definitions of the concept in economic literature. Since the different approaches seem to be rather contradictory in some cases (for example Homburg/Bruhn 2003: 8; Schumacher/Meyer 2004: 19), defining a working definition appears reasonable. Customer Relationship Management, as understood in this article, is a fundamental strategic orientation which is pursued by all members of a company in order to increase customer satisfaction, customer loyalty and the benefit for the consumer as well as for the company during the entire supplier-customer-relationship.

### ***2.2 Holistic Customer Relationship Management***

The concept of the holistic CRM consists of three components – analytical, operational and collaborative CRM – which are built upon each other. The particular modules of an analytical CRM are on the one hand a data warehouse as data pool and on the other hand the analysis of the data, provided that the data are already collected and thus available. In the operational CRM step – built upon the analytical step – precise activities can be derived on basis of the gained knowledge. The collaborative CRM is the last step and contains the intensive and more or less individual contact with the student (Töpfer 2004: 228).

While in chapter 3.4 the implementation of the operational and collaborative CRM is described, chapter 4 is dedicated to a possible implementation of the analytical CRM in Higher Education.

### ***2.3 Introduction to the Customer Relationship Lifetime Cycle***

Due to the cyclical development of the supplier-customer-relationship, Stauss (2000): 15, proposes the transfer of the concept of the product life cycle to customers. In his words, many companies nowadays are facing a change in perspective, moving from product to consumer lifetime focus of the cycle. As illustrated in Stauss (2000): 16, the CRLC is divided into several phases, each of them being assigned to one of the three kinds of customer-oriented management tasks – management of prospective customers, customer loyalty or customer win-back.

According to Stauss (2000): 16, during the initiation stage the customer shows particular interest in products or services offered by a company, although he does not contribute to the financial profit of the company. In this stage an efficient management of prospective customers – with the goal of initiating new business relations – is essential. Deciding to buy a product or a service offered by the company enables the customer to gain first experiences concerning the range of products and the support provided by the supplier. Consequently, he enters the socialization stage – the first stage of the management of customer loyalty – in which the goal of the company should be the consolidation of this new business contact by using an efficient management of new customers (Stauss 2000: 16 ff).

In analogy to the rising sales figures in the chronological sequence of the product life cycle, the customer enters a growth stage by generating rising revenues through follow-up purchases. At the end of this stage, the consumer still contributes high sales volumes, but with stagnating expansion rates. He therefore enters the maturity stage

of the model. During these two phases, the company needs to apply a management of customer satisfaction in order to strengthen already stable business contacts (Stauss 2000: 16 ff).

Following the description of the customer lifetime cycle by Stauss (2000): 16 ff, the decline stage is characterized by a stagnating or even declining intensity of contacts between the customer and the company. For the company it becomes essential to identify endangered relationships by applying an effective complaint management and to impede abrogation by means of churn management<sup>1</sup>. If the company is not successful in communicating its advantages to the customer, he enters the phase of termination. This does, however, not imply that he is to be considered as a lost customer. Rather, the company has to convince him to withdraw his notice by management of termination (Stauss 2000: 16 ff). Should the customer nevertheless abort the relationship, Stauss (2000): 16 ff emphasizes, that the company may try to revitalize it. However, after considering the termination reasons, an abstinence stage may be appropriate.

After describing the CRM as a basis for the following discussion, the focus of the subsequent chapters will be the introduction of the SRM.

### **3. Student relationship**

In order to create a common understanding, the concept of SRM is to be defined in accordance to the working definition of CRM proposed in chapter 2.1. In addition, the reason why institutions of Higher Education in Germany should, respectively will have to introduce such a strategic orientation will be explained.

The content of the following pages is furthermore the development of a SRM concept based on the CRLC described in section 2.3. The intention is to provide a model on which institutions of Higher Education can base its efforts to bind students as early and as long-dated as possible.

#### ***3.1 Reasons for introducing SRM in German institutions of higher education***

Due to the shift of the self-conception of German institutions of Higher Education towards being a service provider in research and teachings (Langer et al. 2001: 2) and due to the increasing stress of competition between academies (Heiling 2003: 4), the question arises, how the concept of a successful CRM can be applied to German universities. Another fact contributing to the increasing interest in possibilities of introducing a SRM are decreasing public funds in general and savings in education in particular. Trends show that expenditures for teaching and research have been continuously rising over the past years, while financial support by the state remained stable (Hahlen 2005: 6f). Therefore, institutions of Higher Education need to apply fundraising for further financial support in addition to governmental financial aid. Potential financiers are – next to the state and public trusteeships – graduates of the academy

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<sup>1</sup> Churn Management is an artificial word, consisting of “change” and “turn” respectively “return”. It describes the attempt to avoid the loss of customers respectively to reduce the rate of shifts to competitors. It is also sometimes referred to as “Regain Management“.

(Giebisch/Langer 2005: 16). The prerequisite is, however, that they have been successfully bound to their educational institution during their time of studies (Ziegele/Langer 2000: 46). Accordingly, German universities need to learn from the economy and modify the concept of a CRM in order to fit their particular needs. As Lemon (2004): 2 discovered, students increasingly see themselves as customers who purchase education services from competing providers. Consequently, German institutions of Higher Education have recognized that offering education is not sufficient to distinguish a university from other academies and to attract prospective students (Oetker 2000: 4).

Due to an increased competition between educational institutions, current and prospective students are increasingly able to enforce their requirements (Spiewak 2005). Therefore, the main advantage for them, arising from the implementation of a SRM, is the consideration of their interests. Furthermore, an effective SRM can improve the quality of teachings by integrating alumni and their practical experience into the lectures, thereby discussing and analyzing real-life cases. Consequently, graduates will be better prepared for their duties on the job and thus a better reputation of their university at companies. This improvement of the image of the educational institution leads to improved prospects for alumni once they enter the labour market. Students interested in highly paid employments will therefore choose the institution in order to establish the basis for their subsequent success in professional life. Increasing numbers of matriculation lead to higher allocation of funds to the university by the state, allowing a better financial endowment. Once the academy has acquired such a status, it can create better study-conditions, e.g. by improving teaching material, offering a better proportion of students to employees and increasing the number of books available at the library. These improved conditions initiate another cycle starting with the attraction of more students (Spiewak 2005).

Huber (2003) has mentioned, that academic perception is about to become an investment relevant asset securing a welfare state's wealth in the long run. Therefore, it is important to attract and bind new students to German educational institutions using an effective SRM to ensure the prosperity of the nation. Huber (2003): 99 has pointed out, that today about 14 percent of all German graduates leave their country – and almost one third of them stay abroad. Consequently, the country loses its most brilliant people which leads to a deterioration of teaching as well as research. To be able to compete on the global market, however, a country needs smart and educated people.

### ***3.2 Transferability of CRM to institutions of higher education***

In order to apply the model of CRM to the concept of SRM, it is necessary to prove the conformity of the services of institutions of Higher Education with the term of services as understood economically. Since the intention of the present paper is an introduction to a student orientation in academies, services offered to companies, research establishments and other institutions are not to be considered.

Haller (2005): 6 f has identified two basic characteristics of services. The first feature – the immateriality – is closely related to the concept of intangibility, implying that a service is neither tangible nor perceptible through sensation of the customer.

Therefore, services are characterized by a high proportion of confidence and expert knowledge attributes compared to the search attributes, which can be appraised by the customer in advance. Furthermore, services are neither superposable nor portable (Haller 2005: 7). These aspects are also applicable in the context of education. When choosing an educational institution, the prospective student is neither able to estimate the quality of the corresponding education nor its capabilities to impart professional competence useful to his career.

The second characteristic – the integration of the external factor – implies that without integrating either the customer himself or an object belonging to him, the service delivery is impossible. Consequently, supply and demand have to be synchronous in time and space, a feature called “uno-actu”-principle (Haller 2005: 8). When applying these aspects to institutions of Higher Education, the student is to be considered as the external factor receiving the service “education“. Through his dedication during the lectures or even as a student assistant, the student essentially influences the result of the service (Langer et al. 2001: 8). In contrast to the customer in a traditional service process, university education is a central factor during the life of a student. Furthermore, to accomplish a successful graduation, the student needs to exhibit a lot of intellectual capabilities as well as high learning motivation (Hennig-Thurau et al. 2001: 332). As the discourse above shows, the service offered by institutions of Higher Education to its students is comparable to the term service as used within the economic context. Therefore, the principles of an efficient CRM can be applied to the sector of Higher Education.

### ***3.3 Development of a model for SRM***

Since the concept of Student Relationship Management is a relatively new approach in German Higher Education Research, most German definitions existing at this time (i.e. Pausits 2005: 145) are based on English proposals. In order to create a common understanding it seems to be applicable to define the term “Student Relationship Management” as a basis for the following illustration.

In accordance to the working definition of CRM proposed in chapter 2.1, the concept of SRM used in this article is to be understood as a fundamental strategic orientation of the entire academy aiming at the increase of student satisfaction and the creation of additional value for the students as well as for the academy. The goal is to bind students to the academy not only during their years of study but particularly after their graduation.

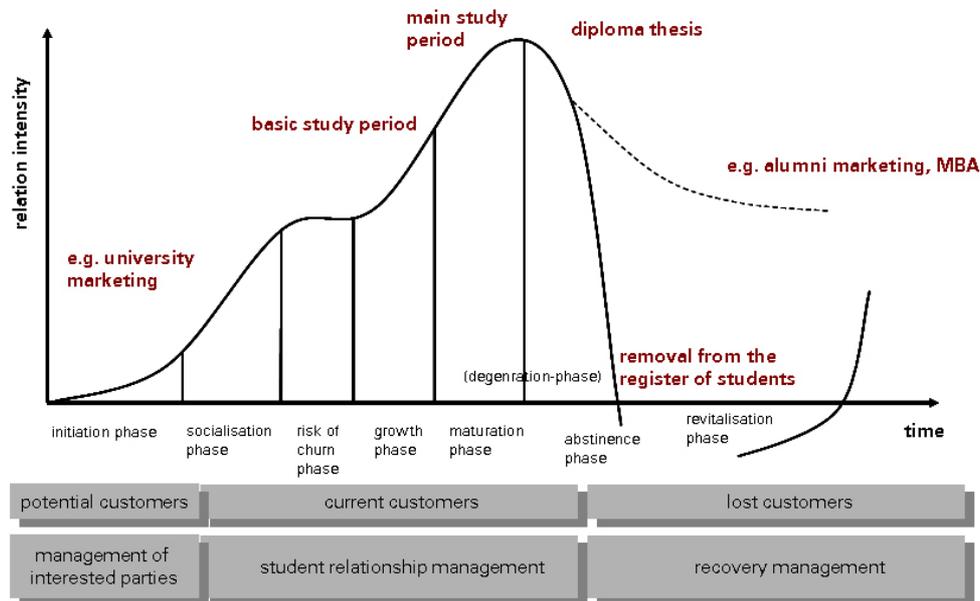
Even though many scholars have discussed the issue of student loyalty and its significance for institutions of Higher Education, a generally acknowledged model of SRM has not been published so far. Recognizing this fact, Hennig-Thurau et al. (2001: 332), proposed a description of student-loyalty as an idealistic multi-phases-concept, covering all stages from enrolment to graduation. For Langer et al. (2001: 63) the prerequisite for an effective linkage between graduates and their academy – generating positive effects for both sides – is the conception of a model of loyalty management.

Both approaches, however, do neither consider initiating relationships to prospective students, nor staying in contact with graduates. In order to include these aspects, the CRLC presented in chapter 2.3 will be modified and applied to institutions

of Higher Education. The result will be an idealistic cycle of a student-university relationship covering all stages from management of prospective students to churn management. When applying the concept of CRM to Higher Education, the student is to be considered the customer requesting the service “education“ (Weinberger 2004: 38).

The main difference between the CRLC and the one proposed for students are the different stages of the process. As figure 1 shows, the student relationship lifetime cycle (SRLC) covers only the stages initiation, socialization, risk of churn, growth, maturity, abstinence and revitalization. The maturity stage ends with the graduation of the student which implies that he does not request the service “education“ any longer. Therefore, neither the decline stage nor the phase of termination needs to be considered. Furthermore, the idealistic course of the supplier-customer-relationship has been adjusted to fit the target group. Due to the missing phase of termination, the intensity of the relationship between alumni and academy decreases faster than in the case of customer and service provider. Moreover, the possibilities for graduates to do a doctorate or to apply for postgraduate professional education of the university have to be considered. In this case, the relationship remains on a high level which represents the prolongation of the maturity stage. Most students, however, leave their alma mater after graduation. In this case, the institution’s objective should be not to completely lose contact to its graduates. This circumstance is considered by inserting the dotted line into the model, which represents the ideal progression of the relationship after implementing an effective SRM.

Figure 1: Student relationship lifetime cycle (Source: according to Stauss 2000: 16)



As already described for the CRLC, the first issue which institutions of Higher Education have to consider is the management of prospective students. In this stage, an ad-

aptation to the requirements of universities is not necessary. Once the university was successful in attracting the application of a prospective student, the fragile relationship needs to be further developed and strengthened. The manifold offers provided for students at American Universities could be an example for German academies, because institutions of Higher Education in the United States have been successful in binding their students for more than 200 years. In particular, Erhardt (2000): 7 emphasizes the abundance of services available to students and the excellent personal supervision as well as institutionalized rituals, ceremonies and traditions, and the universities' corporate identities.

In analogy to the CRLC, the satisfaction of the students needs to be increased during the stages growth and maturity of the relationship. According to a study conducted by Langer in cooperation with the "Centrum für Hochschulentwicklung Gütersloh", perceived quality of teaching has by far the highest impact on student loyalty. Other important factors are the emotional commitment, meaning the perceived responsibility of students towards their university and faculty (Ziegele/Langer 2000: 47), and the academic integration of the students as well as their ambitions to reach their individual objectives (Langer et al. 2001: 47). According to Ziegele/Langer (2000: 48), there are a lot of factors influencing the quality of teaching. They stated, for example, a vast range of teaching offered, supervision of students by employees of the university, and modalities concerning examinations as well as recreation offers.

If a student does enter the abstinence stage by matriculating at another university or by terminating his university education prematurely, he will at first seem out of reach for the educational institution. Consequently, his potential for a longer relationship decreases (Krempkow/Pastohr 2003: 14). To detain the student from entering this stage should be the objective of an effective loyalty management. Therefore, it is necessary to identify the reasons of shifting to another university or dropping out. In addition, students could be informed about further perspectives when staying at the university. If the student decides to leave the institution of Higher Education despite all efforts, the university can try to reinitiate the relationship by management of revitalization.

### ***3.4 Particular measures applicable to the model***

What can an institution of Higher Education do to bind its students during and after their time of studies? Which measures can be applied in order that students identify themselves with the university and are ready to stick up for their university – either in a financial or an active way? In this section, measures will be proposed to help the institutions of Higher Education answer these questions. According to Langer et al. (2001): 64, only measures compatible to the universities' mission to educate will be conceptualized.

#### *Management of prospective students*

In the first stage of the SRLC, prospective students or their parents start looking for an appropriate educational institution. Due to the immateriality of the service education, surrogates are used to estimate its quality. Therefore, it is important to emphasize the institution's strengths and competencies during the initial steps of the SRLC.

One possibility to create the impression of a high quality institution is to design the web page and information leaflets using a uniform layout. Many universities, as the TU Dresden for example, have started to implement a corporate design in order to facilitate orientation when using the web pages to find information. According to Heiling (2003): 2, the allocation of responsibilities at the university is usually intransparent, especially for prospective students. Reasons are often the autonomy of the faculties and the absence of coordination between them. Such circumstances give the impression of a mismanaged institution, leading to a negative perception of the university. In order to avoid such undesirable effects it is necessary to implement a corporate, mutually agreed information strategy, stating the competencies and the used channels of information. Another possibility, already widely used to spark potential students' interest in the offerings of the university, are so called information events. These events serve as a contact point for prospective students to receive a first impression of the educational institution. Since even today - in the era of internet - it is not possible to experience the adventure "university" on-line, these events have not become less important. Some examples to be mentioned in this context are the "open house day", the so called "Schnupperstudium" and the "Schüleruniversität" offered by the TU Dresden. The intention of the initiative introduced as open house days is to present every faculty with its educational offers. On these days, the Technische Universität Dresden offers the possibility to attend recitations, to conduct conversation with either students or scholars as well as to tour the different research establishments (Zentrale Studienberatung 2006c). The Schnupperstudium aims at reaching high-school students as well as teachers who want to find out more about the university. During these days, prospective students are invited to attend lectures in order to get an impression of the every day life of a university student. Furthermore, information on various branches of study is offered next to the possibility to talk to scholars (Zentrale Studienberatung 2006b). The last example is the Schüleruniversität at the Technische Universität Dresden, aiming at high school students with high intellectual potential who are interested in continuing their education. Admitted junior and senior high-school students are allowed to attend preselected lectures - especially in mathematics, natural sciences, engineering, and computer science - thereby obtaining their first credit points counted toward a university degree. The intention is to patronize high-school students in order to bind young talents closer to the TU Dresden (Zentrale Studienberatung 2006a). Concerning the point of view of the institutions of Higher Education, the selection of prospective students is an important factor to improve their subsequent loyalty. Müller-Böling 2000: 10 f has stated, that criteria and methods used to select students should be utilized to communicate values as well as objectives of the university and to create a connection between those values and objectives and the goals of the prospective students.

At the Albert-Ludwigs-University Freiburg, for example, prospective students are able to use a self-assessment tool to decide whether or not their imagination of their chosen field of study corresponds to the actual requirements - before applying on-line for a college place. This shows that the university has already acknowledged the importance of student-selection, defining it as a strategic process. The final goal is to

minimize the risk of wrong decisions during the recruiting process (Albert-Ludwigs-Universität (2006): 3ff).

### *Management of student loyalty*

According to Müller-Böling (2000): 10, relevant factors to bind students to their university are especially supervision during the years of study and assistance when entering professional life. As Heiling (2003): 4 ff argued, service quality, next to an excellent reputation in teaching and research, is an important criterion when competing for the most talented students. However, it is the service quality which is still neglected in the German Higher Educational sector. The number of matriculated students increased slightly during the winter term 2005/2006 (October – March), remaining at a level of about 1.98 million (Statistisches Bundesamt 2006: 6). Considering this high number, it is quite obvious that personalized services are a challenge for educational institutions, which cannot be appropriately met facing a situation of decreasing financial state support. One means to meet the service-needs of such a high number of matriculated students is the implementation and usage of information technology. Heiling (2003): 7 f proposes the introduction of portal systems, thereby eliminating the number of employees in charge as well as the multitude of different points of contact. The objective is to offer an institutional service platform, which allows a personalized access according to the needs of the student. In this context, one starting point could be represented by the integration of different application and information systems as for example administration of examinations, e-learning systems, e-mail service and library catalogues. However, the integration of these different systems requires a transmission of personal data, which has to be treated with care due to the strict regulations of the Bundesdatenschutzgesetz (BDSG) - German Federal Law for Data Protection - about elicitation and disposition of data. In §3(1) BDSG personal data are defined as “Einzelangaben über persönliche oder sachliche Verhältnisse einer bestimmten oder bestimmaren natürlichen Person”<sup>2</sup> (BDSG 2006: 5). Name, gender, birth date and education are examples for information affected by this definition. In addition, with the application of §4 BDSG, personal data can only be used for further processing if it has either been permitted by law or by another legal provision, or if the party concerned has agreed by means of a contract (BDSG 2006: 5 ff). To meet these restrictions when offering different functionalities of an implemented portal system, the students’ authorization concerning the collection and usage as well as archiving of these personal data needs to be obtained. Since users might only want to take advantage of the basic functionalities out of a wide range of possibilities offered by the system, a global gathering of the data is to be avoided. Students should be able to authorize the concession of their personal data according to the functionalities which are of particular interest to them. Such a system impedes the usage of personal data for undesired services and ensures the protection of personal rights of every individual. Major disadvantages of the introduction of such a comprehensive and global information portal are the dimensions and the complexity of the system. Since this can be seen as one of the rea-

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<sup>2</sup> English translation: “Particulars about personal circumstances or artefacts of a specific or a determinable natural person.”

sons for the existence of many information and communication channels which are neither standardized nor synchronized, Heiling (2003): 9, proposes a multi-channel-access. It enables students to use different media in order to obtain information and to contact the staff of the university. When implementing such a multi-channel-access, however, it is necessary to guarantee conformance of the contents of the different channels offered. Heiling (2003): 9 adds that concentrating on a small number of communication channels, as for example the internet or e-mail, is not desired by all students. Therefore, offering contact possibilities such as visiting times, telephone conversations and postal services, should remain in existence.

Many software providers have already identified the potential of portal-solutions for institutions of Higher Education. SunGard Higher Education, for example, offers a system designed to fit the students' needs throughout their whole university-enrolment. This system, which is currently in the process of implementation for example at the University of Iowa, offers students all the information they need concerning their field of study – ranging from curriculum to contact information – and thus improves the perceived quality of service (SunGard Higher Education 2005 and SunGard Higher Education 2007).

Next to the improvement of the service, another crucial point is the variety and quality of offered teachings. For Langer et al. 2001: 5, 48, advancing the quality of teachings is the most important element in the process of binding students. Primarily, they say, an institution of Higher Education should concentrate on the configuration of the offer of teachings and the supervision of students by professors and other staff. The organization of examinations, services and infrastructure as well as spare-time offers are secondary.

An evaluation of these facts leads to priorities concerning the implementation of quality-improving measures. In addition, Langer et al. 2001: 5 detected, that improvement of the quality of teaching by its own is not enough to bind students in the long-run. Therefore, on the one hand, the university should offer events and activities on a facultative basis. On the other hand, it is important to support students' initiatives and to broadly integrate students in teaching and research. Since these approaches to an academic integration create a higher emotional commitment – defined as voluntary commitment – they are more effective in achieving the objective of binding students than social integration achieved through university sports programs and parties. The basis of a high commitment towards the university is a high degree of integration of the student in the workflows of the academy (Langer et al. 2001: 24 f).

#### *Management of retrieval*

After students leave the university, the institution should attempt not to lose contact to its alumni. In doing so successfully, it retains the possibility of convincing them to return to their alma mater for further cooperation. In this context it is not only important to regain them as prospective students, but also to keep them integrated in scientific activities. Consequently, valuable practical experience can be integrated to improve the quality of teaching, for example through visiting lecturers. This mode of cooperation reflects the definition of a SRM elaborated in section 3.3, which stated that the relationship should also generate value for the university. Prerequisite for this

positive collaboration is to keep alumni informed about postgraduate professional education on the one hand and up to date concerning the university's research on the other. Alumni-networks are a central contact point for alumni who are further interested in incidents taking place at their alma mater. These networks are designed to meet the requirements and needs of graduates. According to a study conducted by Krempkow/Pastohr (2003): 75, top earners, for instance, are willing to keep contacts to their faculty, but usually they are living and working far away. Therefore, one of their needs is the availability of information through media which are able to overcome this distance. The alumni-network of the TU Dresden, for example, consists of different associations, each of which is assigned to a faculty. Their members regularly receive information and benefit from the extensive possibilities of sharing technology and know-how. Responsible for the supervision of alumni is an office which keeps graduates informed about events according to their field of study. Furthermore, next to an alumni-platform providing, for example, information about alumni-specific news, job offers and friends of the university as well as the online newspaper "Kontakt-online", printed media containing up to date information are also published on a regular basis. In addition, an alumni-day is organized every year in cooperation with the university day (Kokenge 2006: 8 f). In the year 2000, the "Stifterverband für die deutsche Wissenschaft"<sup>3</sup> has initiated a challenge called "AlumniNetzwerke" (alumni networks). Competing with other universities in terms of organization and service, nexus – the alumni association of the faculty of economics of the TU Dresden – was rated third (Albrighton 2000: 52). This excellent ranking shows that the faculty of economics is already successful in working with its alumni, being therefore considered an ideal for other alumni-organizations (Meyer-Guckel 2000: 60 ff). The examples listed above show, that if the institution of Higher Education aims at reaching alumni students – graduates as well as college dropouts – alumni and dropouts have to be informed about further offerings of the university.

#### **4. Prospect: Data mining and its range of applications in higher education management**

The previous results deal with the operational CRM – in terms of student-oriented adjustment of educational processes for a strategically student-group oriented behaviour – and the collaborative CRM – in terms of intensive and individual contact with the students. In the following chapter the possibilities of the analytical CRM are shown exemplarily, such as the improvement of service quality for students on basis of results of data mining analysis.

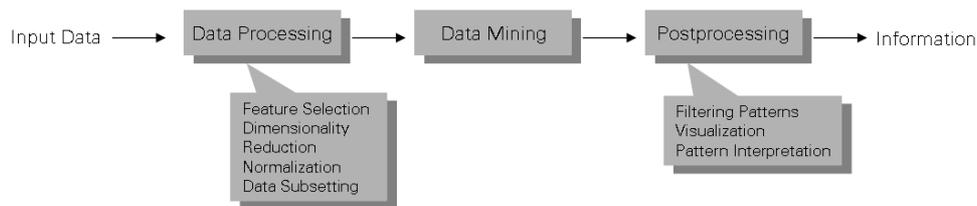
*Data mining is an integral part of knowledge discovery in databases (KDD), which is the overall process of converting raw data into useful information* (Tan et al. 2006). This process is represented in Figure 2 and consists of five steps. During the data preprocessing, the input data are prepared (e.g. by means of dimension reduction). Afterwards, the individual data mining methods are applied, followed by the post processing of the data (e.g. the visualization of gained information) and the extraction of the gained information. In the data mining step, a multitude of trans-sectoral data analysis methods can be

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<sup>3</sup> English translation: Founder association of German science.

used, which are derived from the fields of statistics, artificial intelligence, and machine learning (Petersohn 2005: 57 ff). Table 1 shows possible questions in the field of Higher Education Management which can be analysed and answered with data mining methods. These are equivalent to the appropriate questions of the economy. Real and hypothetical (case) studies in the context of Higher Education Management have already been accomplished, especially in the USA. One example is the identification of student typologies, which are used to divide students into different groups of learning typologies. In order to do so, students were identified and clustered by means of different data mining methods. Furthermore, forecasts of the successful completion of studies respectively drop out can be generated and, according to that, students can be supervised. Luan (2004: 6) shows, how data mining helps universities to focus on alumni most likely to make pledges and to optimize mailing costs, especially when considering outliers (e.g. unexpectedly high donations of alumni). In summary, the yielded results of the data mining analysis can be used to better allocate resources and staff, proactively manage student outcomes, and improve the effectiveness of alumni development in educational institutions (Luan 2004: 4-7).

**Figure 2: Process of data mining** (Source: Tan et al. 2006)



**Table 1: Possible data mining questions in the business sector and their counterpart in the higher education sector** (Source: Luan 2004: 2)

Private Sector questions	Higher Education questions
Who are my profitable customers?	Which students are taking the most „credit hours“ <sup>4</sup> ?
Who are my repeat Web site visitors?	Which students are most likely to return for more classes?
Who are my loyal customers?	Which are the persisters at my college /university?
Who is likely to increase his/her purchases?	Which alumni are likely to make larger donations?
Which customers are likely to defect to competitors?	What type of courses will attract more students?

One data mining method is the association analysis, where correlations between conjoined occurring objects are analysed. It may concern e.g. products of a supermarket, which customers bought together – the so called basket analysis (Bollinger 1996: 257). In the field of Higher Education Management not the products but the frequently selected major fields of study of students can be examined. Within the framework of SRM, the students can benefit from the results of such analysis, for example by reducing overlaps in their curriculum and thus minimizing their duration of study. Conse-

<sup>4</sup> Credit Hours are the number of semester periods per week divided by the product of credit points and marks.

quently, attention to the development of the time table could be paid in order to avoid the overlapping of courses of two major fields of study. Thus students have the possibility to enrol for courses of both major fields of study in the same semester and do not have to wait for one or two semesters.

Furthermore, students can be supported by faculty staff according to their individual needs. For prospective students it offers the possibility to survey the combination of major fields of study, whose relevance has been proved in practice – adapted from historical data. Based on these individual offers for students, the university is able to improve its image, which leads to higher numbers of student enrolments leading to a higher allocation of funds. Another benefit of data mining in the framework of SRM arises from analyzing donation behaviour of alumni – using the obtained information for individual mentoring of alumni. As Luan (2004: 2) points out, one *“way to effectively address [...] student and alumni challenges is through the analysis and presentation of data, or data mining”*.

However, in this context, acting in conformance to the German data protection act is problematic. For further analysis and methods data are needed, which are available but may not be used (e.g. data of enrolment). According to §4 paragraph 2 Federal Law for Data Protection (in the version of 2003) (Gola/Schomerus 2005), data may only be used for the purpose they were collected for. A possible solution to this restriction may be to set up a data warehouse as already implemented in the United States. Facing a similar legal situation concerning the data security presented comparable constraints to data analysis, researcher collect their data using survey portals, as e.g. NSSE (national survey of student engagement). The corresponding basis for data analysis is represented by a data warehouse which contains a large data set of about 100 colleges and resembles data warehouses used in the economy.

## 5. Result and prospect

As shown above, potential uses of CRM can be found throughout the field of Higher Education. Due to changes in the educational system – e.g. the increasing international competition in the education market – and persistent financial shortage, most German universities have already recognized, that they have to endeavour after the satisfaction of students as well as alumni (Ewers 2000: 24 f). First approaches of introducing a SRM – enhancing the satisfaction of students respectively keeping up the contact to alumni – are already identifiable. However, a common model as well as a clearly defined concept for an effective realization of student-orientation is still missing.

The presented article shows also future possibilities for the use of data mining methods in the German Higher Education Management and for the use of the yielded results particularly in the SRM. Applying the results of the analysis supports the service quality for students as part of a SRM. The university can determine the needs of its students and consequently improve the relationship.

Altogether the improvement of the connection between students and university can lead to increasing student quantities in the future and thus also to increasing revenues for the university. By the adjustments of the event management to the needs of the students, the time of study can be reduced. As a final conclusion it is to state, that German institutions of Higher Education need to differentiate themselves from rival-

ling academies to be able to obtain the desired number of matriculations in future times. Therefore, the importance of implementing an effective SRM will continue to rise within the next years.

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