

Alumni Knowledge Management Metrics for the Advancement of Industry University Collaboration

Anita STRAUJUMA, Elina GAILE-SARKANE, Modris OZOLINS, Iveta OZOLINA-OZOLA
Faculty of Engineering Economics and Management of Riga Technical University
Kalnciema 6, Riga, LV1048, Latvia

ABSTRACT

Purpose of the research is to study customer knowledge management (CKM) application and metrics in alumni relations management (AR) in universities. CKM is one part of the knowledge management process which focuses on capturing, saving and reusing customer knowledge. Universities are not an exception and their customer knowledge is valuable for competitiveness. Author describes a unique model and metrics that is developed for alumni-CKM and can be applied by AR managers. Metrics serves for organization to determine if they are “better than yesterday and if they are better of worse, or doing just as well as their competitors are” [1]. Knowledge management is not an exception and the current situation and performance must be regularly measured to be able to see the progress and make strategic decisions.

Keywords: Knowledge Management, Alumni, Customer Knowledge Management, Knowledge Management Metrics.

1. INTRODUCTION

Universities in all times have cooperated with their alumni. The written history registers that organized and deliberate alumni relations management started in 18th century [2]. The reasons for university deliberate relationship building with alumni have always been the same - networking among alumni, alumni lobbying, knowledge support for improvements in the universities and financial support by alumni to the university. The organizational forms have varied in different times and different regions. Alumni are one of the most important assets of the universities [3] but what is their role and place in the university? Customer concept implies people or organizations that purchase the goods or services from business or merchant or intend to do so [4], [5]. Alumnus/alumna (alumni for plural) is “a person who has attended or has graduated from a particular school, college, or university” [6]. On the first sight, these two concepts are controversial since the first one is in present or future transaction but the other implies that transactions and relationship have ended. However several authors define alumni as Higher Education and Research Institution (HERI) customers not only in direct meaning when they purchase HERI services but also continuously because the value of their diploma always depends on the HERI performance at that particular moment [7]–[9]. Universities invest more and more effort in integrated activities to identify, maintain and build network of customers and partners for mutual benefit [10]. Knowledge management is defined as the process of applying a systematic approach to the capture, structuring, management, and dissemination of knowledge throughout an organization to work faster, reuse best practices, and reduce costly rework from project to project [11]. Customer knowledge management (CKM) is a discipline that integrates customer relationship management and knowledge

management [12]–[14]. CKM changes customers from passive recipients of goods or services into valuable knowledge source for the organization [15]. CKM encompasses acquiring, dissemination and usage of the customer knowledge within the organization for mutual benefit of the product/service provider and the customer [16]. History and culture of alumni relations in HERI in Baltics is very recent underdeveloped. Surveys reflect that alumni are reluctant to support HERI financially but are ready to share their knowledge. This leads to research problem: how to manage and measure alumni knowledge for advancement of HERI and industry collaboration? **Research objective** is to develop alumni knowledge management model and metrics that involve all alumni relations and HERI functions and provide sustainable mutual development and collaboration.

2. METHODOLOGY OF RESEARCH

The study is a result of systematic literature overview by analysis of scientific articles, monographs, conference materials and other relevant literature. Expert opinions were gathered during interviews of alumni relations managers in the European Universities, the results were supported by case studies and by conducting two surveys reflecting both views – the university perception and alumni perception of alumni-university relationship. Qualitative and quantitative data analysis methods were applied.

3. ALUMNI KNOWLEDGE MANAGEMENT MODEL

Moving away from universities’ traditional two roles of creating knowledge (research) and disseminating knowledge (teaching), Draghici et al describe three main roles for the universities: “education (smart people), research (new knowledge) and knowledge transfer to society (entrepreneurship, technology, expertise)” [17]. Oosterlinck discusses that universities are expected not only to be active in science and technology development but also to turn these developments into innovations and even further implement creation of new ventures [18]. Thus universities are required to maintain bilateral knowledge flow to keep up with innovative learning and teaching [19]. One of alumni roles in the university is being lifetime customer. Knowledge management is of growing importance within HERI. Authors present an alumni customer knowledge management (model (see Figure 1) that is inspired by CKM model of Gebert et al [12]. These authors had developed a model for organization where marketing, sales and service are primary business functions. Here it is fully transformed to the functions of alumni relations and HERI.

Alumni Customer Knowledge Management model was developed by authors applying both, theoretical and field research. Alumni as customer lifecycle is adapted to classical customer lifecycle and merged with Triple Helix Model of Alumni Segmentation, developed by authors. The segmentation divides alumni in 3 big groups (Finance, Knowledge, Cocreation

capacity) and in each group splits them according to the level of involvement (Streamline, Status, Star, Strategic).

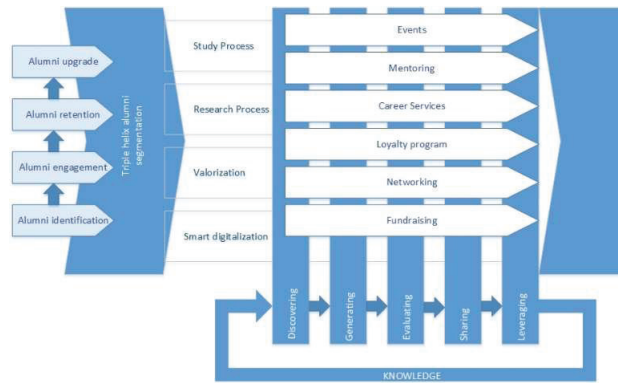


Figure 1. Alumni Customer Knowledge Management model developed by authors on based on main principles of Gebert, et al model [12]

The alumni lifecycle with each cycle aims for deeper engagement and closer ties, more personal relationship and higher investment in the university. It consists of four consecutive stages:

1. Identification – finding alumni, discovering their knowledge, needs, interests and capacity, segmenting;
2. Engagement – meaningfully engaging new alumni in alumni and/or university activities;
3. Retention – building long term relationship with alumni, deepening loyalty, encouraging advocacy;
4. Upgrade – once higher level of engagement is reached and maintained for a certain period, upgrade alumni to next segment to create new forms of engagement and to build more personalized relationship.

Once alumni are identified, they become engaged in university and alumni functions.

Study process, research, valorization and smart digitalization are primary functions of the university [20]. The further model is derived by deconstructing these functions into relevant alumni relations functions. Synergies between main processes and alumni relations functions can appear in any place. There are six most typical alumni relations processes: event management, mentoring and career services, loyalty program, networking, valorization and fundraising activities.

Events – custom designed events targeted for alumni. They can be both, entertaining or educational, by nature. Examples: seminars, company visits, inspirational speeches, trips to university labs, homecomings, etc.

Mentoring, career service – alumni-student or alumni-alumni mentoring supported and organized by career or alumni relations office; career support also for alumni. Example: portal for job adverts, networking platform; career advice by university career center, etc.

Loyalty program – access of university infrastructure, products or services for alumni for a special price. It can involve providing university further education courses with special conditions (discounts, place reservation etc.) Loyalty program can also involve alumni to alumni discounts where entrepreneurs offer discounts for their business products/services for fellow alumni. The program can be supported by alumni ID cards.

Networking – events and services that support alumni networking. Example: online platform with alumni directory, integration with social networks; networking events – live library, wine tastings, fucup, etc.

Career services – projects and activities involving alumni career development.

Fundraising – open fundraising projects that offer alumni opportunities to contribute finances in projects that are strategically important for the university, involves also student scholarships.

Knowledge management cycle [21] is present in all functions of the university and alumni relations. It also involves university knowledge management functions from Davenport et al, Rowley and García-Murillo et al knowledge management model ([22], [23] and [24]):

Discovering knowledge – involves alumni-employee personal interaction, knowledge identification; in other models revealing [24];

Generating knowledge – using existing knowledge to create new knowledge. In other models: knowledge levelling [24];

Evaluating knowledge – valuation of knowledge, assigning values to knowledge assets, determining strategic value of the knowledge; in other models knowledge sorting [24], valuing [22], [23];

Sharing knowledge – knowledge coding, storing, publishing, knowledge sharing in groups – training, experience sharing; in other models knowledge externalization, socialization [25]; knowledge levelling [24]; access [22], [23];

Leveraging knowledge – use of acquired knowledge to generate high level intellectual capital. Term leverage means “ability of relatively small amount of cost yield relatively high returns” [26] “to use something that you already have in order to achieve something new or better” [27].

4. ALUMNI KNOWLEDGE MANAGEMENT INDEX

According to Milton [28] KM metrics system should be designed so that it answers one or more questions:

1. “Does KM add value to the organization? If it does, we will invest in KM implementation.
2. Do we have all the components that will allow us to do KM? If not, what’s missing?
3. Is KM implementation on track? If not, what needs to be fixed, and where?
4. Are people doing KM? Who is doing well, who is not doing well?
5. Is our approach to KM delivering value? Because, if it isn’t, let’s stop (or find a better way)”

Alumni knowledge management index (*AKMI*) is developed by authors to provide comprehensive metrics of alumni knowledge management (see Figure 2).

$$AKMI = f(\alpha, \beta, \gamma)$$

α – strategy

β – alumni relations

γ – knowledge management

$$AKMI = \Delta SAR * \Delta CKM$$

$$AKMI \rightarrow 0$$

ΔSAR – strategic gap (see further 5. Strategy and alumni RELATIONS)

ΔCKM – knowledge gap (see further

6. Strategy and alumni KNOWLEDGE MANAGEMENT)

The closer alumni knowledge management index is to zero the smaller is the gap between university strategic needs for alumni knowledge and actual alumni relations performance.

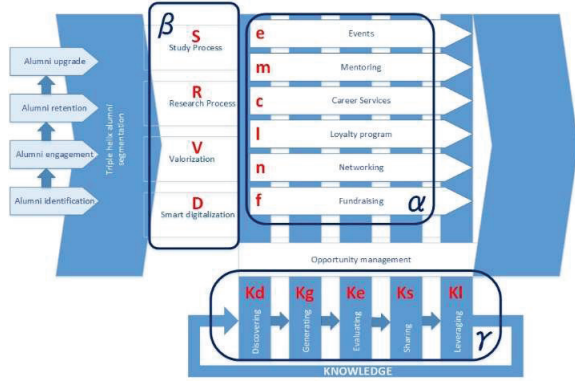


Figure 2. Alumni knowledge management model variables for AKMI

5. STRATEGY AND ALUMNI RELATIONS

The aim is for the university desired strategic alumni relations SAR_u to be as close as possible to actual alumni relations activities SAR_a . Alumni relations must plan activities so that gap ΔSAR is minimized and tends to zero.

ΔSAR – strategic gap;

SAR_u – strategic (study, research, valorization, digitalization) processes, university weight applied;

SAR_a – strategic (study, research, valorization, digitalization) processes, alumni weight applied.

$$\Delta SAR = SAR_{\alpha\beta u} - SAR_{\alpha\beta a}$$

$$SAR_u = f(\alpha, \beta, u) = (Su + Ru + Vu + Du)$$

$$SAR_a = f(\alpha, \beta, a) = (Sa + Ra + Va + Da)$$

$$\alpha = (S R V D)$$

$$\beta = \begin{pmatrix} e_1 & m_1 & c_1 & l_1 & n_1 & f_1 \\ e_2 & m_2 & c_2 & l_2 & n_2 & f_2 \\ e_3 & m_3 & c_3 & l_3 & n_3 & f_3 \\ e_4 & m_4 & c_4 & l_4 & n_4 & f_4 \end{pmatrix}$$

The desired value of alumni relations activities in each university strategic directions.

Desired value of alumni relations activities SAR_u is calculated by summing up values of alumni activities in each university strategic directions. It is expressed in formula as follows:

S_u – alumni relations activities related to study process;

W_u – university weight (coefficient) for the importance of the activity applied (taken from university strategy);

es_i – study process related events factors;

ms_i – study process related mentoring factors etc..

$$S_u = W_{ue} \sum_{i=1}^n es_i + W_{um} \sum_{i=1}^n ms_i + W_{uc} \sum_{i=1}^n cs_i + W_{ul} \sum_{i=1}^n ls_i + W_{un} \sum_{i=1}^n ns_i + W_{uf} \sum_{i=1}^n fs_i$$

R_u – alumni relations activities related to research process, university weight (coefficient) for the importance of the activity applied;

er_i – research process related events factors;

mr_i – research process related mentoring factors etc..

$$R_u = W_{ue} \sum_{i=1}^n er_i + W_{um} \sum_{i=1}^n mr_i + W_{uc} \sum_{i=1}^n cr_i + W_{ul} \sum_{i=1}^n lr_i + W_{un} \sum_{i=1}^n nr_i + W_{uf} \sum_{i=1}^n fr_i$$

V_u – alumni relations activities related to valorization process, university weight (coefficient) for the importance of the activity applied;

ev_i – valorization process related events factors;

mv_i – valorization process related mentoring factors etc..

$$V_u = W_{ue} \sum_{i=1}^n ev_i + W_{um} \sum_{i=1}^n mv_i + W_{uc} \sum_{i=1}^n cv_i + W_{ul} \sum_{i=1}^n lv_i + W_{un} \sum_{i=1}^n nv_i + W_{uf} \sum_{i=1}^n fv_i$$

D_u – alumni relations activities related to digitalization process, university weight (coefficient) for the importance of the activity applied;

ed_i – digitalization process related events factors;

md_i – digitalization process related mentoring factors etc..

$$D_u = W_{ue} \sum_{i=1}^n ed_i + W_{um} \sum_{i=1}^n md_i + W_{uc} \sum_{i=1}^n cd_i + W_{ul} \sum_{i=1}^n ld_i + W_{un} \sum_{i=1}^n nd_i + W_{uf} \sum_{i=1}^n fd_i$$

Current (existing) value of alumni relations activities in each university strategic directions.

The existing value of alumni relations activities in each university strategic directions can be calculated as follows (es_i , er_i , ev_i , etc. remain as in previous (SAR_u) formula):

S_a – alumni relations activities related to study process, alumni weight (coefficient) for the importance of the activity applied;

W_a – alumni weight (coefficient) for the importance of the activity applied (taken from alumni survey);

$$S_a = W_{ae} \sum_{i=1}^n es_i + W_{am} \sum_{i=1}^n ms_i + W_{ac} \sum_{i=1}^n cs_i + W_{al} \sum_{i=1}^n ls_i + W_{an} \sum_{i=1}^n ns_i + W_{af} \sum_{i=1}^n fs_i$$

R_a – alumni relations activities related to research process, alumni weight (coefficient) for the importance of the activity applied;

$$R_a = W_{ae} \sum_{i=1}^n er_i + W_{am} \sum_{i=1}^n mr_i + W_{ac} \sum_{i=1}^n cr_i + W_{al} \sum_{i=1}^n lr_i + W_{an} \sum_{i=1}^n nr_i + W_{af} \sum_{i=1}^n fr_i$$

V_a – alumni relations activities related to valorization process, alumni weight (coefficient) for the importance of the activity applied;

$$V_a = W_{ae} \sum_{i=1}^n ev_i + W_{am} \sum_{i=1}^n mv_i + W_{ac} \sum_{i=1}^n cv_i + W_{al} \sum_{i=1}^n lv_i + W_{an} \sum_{i=1}^n nv_i + W_{af} \sum_{i=1}^n fv_i$$

D_a – alumni relations activities related to digitalization process, alumni weight (coefficient) for the importance of the activity applied.

Alumni relations activity factors.

Each university can define amount and values of factors for each alumni relations activity:

	Factor	Description	Data type
Event factors	e1	Average amount of event attendants	Real number
	e2	Events per year	Integer
	...		

	En	Average evaluation of events (from surveys after the events).	Real number (1 to 10)
Mentoring factors	m1	Mentoring cases successful	Integer
	m2	Total mentoring cases	Integer
	...		
	Mn	Mentee satisfaction (from surveys) Scale 1 to 10 Number from scale 1 to 10	Real number (1 to 10)
Career factors	c1	Work adverts	Integer
	c2	Real matching cases (alumni gets job from university career portal)	Integer
	...		
	cn	Alumni satisfaction with career services (from surveys) Number from scale 1 to 10	Real number (1 to 10)
Loyalty prog. Factors	l1	Number of agreements	Integer
	l2	Real transactions (alumni use discounts)	Integer
	...		
	Ln	Alumni satisfaction with loyalty program (from surveys) Number from scale 1 to 10	Real number (1 to 10)
Networking factors	n1	Number of networking events	Integer
	n2	Number of success stories	Integer
	...		
	nn	Alumni satisfaction with networking events and services (survey) Number from scale 1 to 10	Real number (1 to 10)
Fundraising factors	f1	Number of fundraising campaigns	Integer
	f2	Number of participants (alumni donating)	Integer
	...		
	fn	Target completion success Number from scale 1 to 10	Real number (1 to 10)

6. STRATEGY AND ALUMNI KNOWLEDGE MANAGEMENT

The aim is for the university desired alumni knowledge $CKMu$ to be as close as possible to actual results of alumni knowledge activities $CKMa$. Alumni relations must plan activities so that gap ΔCKM is minimized and tends to zero.

Knowledge gap.

ΔCKM – knowledge gap:

$$\Delta CKM = CKM_{\alpha\gamma u} - CKM_{\alpha\gamma a}$$

$$CKM_u = f(\alpha, \gamma, w_u)$$

$$CKM_a = f(\alpha, \gamma, w_a)$$

α – strategic processes;

$$\alpha = (S R V D)$$

S – Study process;

R – Research process;
V – Valorization process;
D – Digitalization process.

γ – customer knowledge management

$$\gamma = f(Kd, Kg, Ke, Ks, Kl)$$

Kd – knowledge discovering;

Kg – knowledge generating;

Ke – knowledge evaluating;

Ks – knowledge sharing;

Kl – knowledge leveraging;

WS – coefficient for science related knowledge;

WR – coefficient for research related knowledge;

WV – coefficient for valorization related knowledge;

WD – coefficient for digitalization related knowledge.

$$\alpha_i = (S R V D)$$

$$\gamma_{ij} = \begin{pmatrix} Kd_1 & Kg_1 & Ke_1 & Ks_1 & Kl_1 \\ Kd_2 & Kg_2 & Ke_2 & Ks_2 & Kl_2 \\ Kd_3 & Kg_3 & Ke_3 & Ks_3 & Kl_3 \\ Kd_4 & Kg_4 & Ke_4 & Ks_4 & Kl_4 \end{pmatrix}$$

$$w_j = \begin{pmatrix} WS \\ WR \\ WV \\ WD \end{pmatrix}$$

$$CKM_{\alpha\gamma} =$$

$$= (S R V D) \begin{pmatrix} Kd_1 & Kg_1 & Ke_1 & Ks_1 & Kl_1 \\ Kd_2 & Kg_2 & Ke_2 & Ks_2 & Kl_2 \\ Kd_3 & Kg_3 & Ke_3 & Ks_3 & Kl_3 \\ Kd_4 & Kg_4 & Ke_4 & Ks_4 & Kl_4 \end{pmatrix} \begin{pmatrix} WS \\ WR \\ WV \\ WD \end{pmatrix}$$

Customer knowledge management desired value (university coefficients w_{ju}):

$$CKM_{\alpha\gamma u} = \sum_{i=1}^4 \sum_{j=1}^4 \alpha_i \gamma_{ij} w_{ju}$$

Customer knowledge management existing situation (alumni coefficients w_{ja}):

$$CKM_{\alpha\gamma a} = \sum_{i=1}^4 \sum_{j=1}^4 \alpha_i \gamma_{ij} w_{ja}$$

Alumni knowledge management factors.

Each institution can define alumni management factors according to its strategy and existing or desired practice. The factors that are listed below are illustrative examples.

	Factor	Description	Units
knowledge discovering	kd1	Quality of stored knowledge	Real number (1-10)
	kd2	Level of knowledge updating	Real number
	kd3	Quantity of useful suggestions incorporated to productive processes and/or products	Integer

	kd4	Statistics of utilization of the search mechanism	Integer
knowledge generating	kg1	Quantity of discussion groups on process or product innovation	Integer
	kg2	Quantity of valid contributions for organizational memory /intranet	Integer
	kg3	Number of ideas or patent	Integer
	kg4	Evidence of best practice (countable amount)	Integer
knowledge evaluating	ke1	Comparison between number of measurement planned hours and actual hours	Real number
	ke2	Number of evaluations made in comparison with the plan	Integer
	ke3	Experts evaluation to check quality	Real number (1-10)
	ke4	User's feedback	Real number (1-10)
knowledge sharing	ks1	Quantity of messages or documents stored in the system	Integer
	ks2	Number of registered users who use the system	Integer
	ks3	Quantity of editions or updates	Integer
	ks4	Average time to solve problems	Real number
knowledge leveraging	kl1	Quantity of active communities of practice	Integer
	kl2	Statistics on use of organizational memory / intranet	Integer
	kl3	Perception of collaborators with available internal means of communication	Real number (1-10)
	kl4	Cost of distribution	Real number

7. CONCLUSIONS

Universities shift from their traditional academic to a new entrepreneurial role as promoters of innovation to significantly contribute to their local economics. Now universities must balance between curiosity driven academic research and strategy driven corporate R&D research. At the same time, lifecycle of students' relationship with universities has shifted from traditional view of termination at the graduation point to a life-long relationship. Nowadays needs of students and alumni are continuous growth in knowledge and skills demanded by rapidly developing market. Continuous learning availability is growing with expanding support of technologies. Knowledge management in universities:

1. Creates link between work and education;
2. Helps to create talents matching to workplace demands;
3. Contributes to convergence of new knowledge with existing one;
4. Incorporates real problems in the learning and knowledge creation process.

On the basis of the research alumni knowledge management model and knowledge management index was approved and research objective was reached.

Alumni knowledge management index covers all spectrum of alumni relations activities, university strategic directions and knowledge management cycle. The main challenge for performing calculations is getting the data for all variables. The means, energy and finances spent of getting the data should not exceed the value that the calculated results give to our understanding of the current situation and actions on the future strategies. Especially the factors that require opinions and evaluations of the customers – nowadays there is such information richness and abundance that it is getting more and more difficult and thus expensive to get high quality data. In order to make valid comparison of attitudes, they should be measured regularly, e.g. yearly. That is a good practice but it is not always economically feasible for small alumni relations offices in the universities. Further research can investigate other types of knowledge metrics that is applicable in universities. One of most suitable for adaption in alumni knowledge management is Balanced Scorecard, developed by [29] which distinguishes Financial, Internal, Customer, and Learning and Growth perspectives that are essential to the strategy. Customer knowledge management clearly fits in as *learning and growth* and *customer* aspects are two cornerstones of the measurement metrics.

8. REFERENCES

- [1] D. A. Moreira, **NoDimensões do desempenho em manufatura e serviços**. São Paulo, 1996.
- [2] R. W. Sailor, "The American Alumni Council", **The Journal of Higher Education**, Vol. 1, no. 6, pp. 339–341, 1930.
- [3] H. Chi, E. L. Jones, and L. P. Grandham, "Enhancing mentoring between alumni and students via smart alumni system", **Procedia Computer Science**, Vol. 9, pp. 1390–1399, 2012.
- [4] E. Britannica, "Encyclopedia - Britannica Online Encyclopedia", **EBU**, 2011, <http://www.school.eb.com.au/all/comptons/article-9275557?query=martin+luther&ct=null> [electronic source]
- [5] Oxford university press, **Oxford dictionary. Alumni**, 2017, <https://en.oxforddictionaries.com/definition/alumnus> [electronic source]
- [6] Cambridge University Press, **Cambridge dictionary. Alumni**, 2017, <http://dictionary.cambridge.org/dictionary/english/alumni> [electronic source]
- [7] A. S. Taiwo, "Customers: Identifying the needs in higher education", **Educational Research**, Vol. 1, no. 7, pp. 210–218, 2010.
- [8] P. Kotler and K. Fox, **Strategic Marketing for Educational Institutions**, 1995.
- [9] R. Heckman and A. Guskey, "The Relationship between Alumni and University: Toward a Theory of Discretionary Collaborative Behavior", **Journal of Marketing Theory and Practice**, Vol. 6, no. 2, pp. 97–112, 1998.
- [10] G. B. Grant and G. Anderson, "Customer relationship management: a vision for higher education", **Web Portals and Higher Education Technologies to Make IT Personal**, pp. 23–32, 2002.
- [11] I. Nonaka; H. Takeuchi, **The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation**, 1995.

- [12] H. Gebert, M. Geib, L. Kolbe, and W. Brenner, "Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts", **Journal of Knowledge Management**, 2003.
- [13] T. Chen, "An integrated process-based customer knowledge management model", **Journal of Knowledge Management Practice**, Vol. 12, no. 4, 2011.
- [14] C.-J. Shieh, "Study on the relations among the customer knowledge management, learning organization, and organizational performance", **The Service Industries Journal**, Vol. 31, no. 5, pp. 791–807, 2011.
- [15] T. D. T. Sofianti, K. Suryadi, R. Govindaraju, and B. Prihartono, "Customer Knowledge Co-creation Process in New Product Development", **Proceedings of World Congress of Engineering 2010 (WCE 2010)**, Vol. 1, pp. 335–340, 2010.
- [16] A. Khosravi, A. B. Razak, and C. H. E. Hussin, **Customer Knowledge Management: Development Stages and Challenges**, Vol. 91, no. 2, pp. 264–274, 2016.
- [17] A. Draghici, C.-F. Baban, M.-L. Gogan, and L.-V. Ivascu, "A Knowledge Management Approach for The University-industry Collaboration in Open Innovation", **Procedia Economics and Finance**, Vol. 23, no. October 2014, pp. 23–32, 2015.
- [18] A. Oosterlinck, "University/industry knowledge management: A university perspective", **Paris Organisation for Economic Co-operation and Development**, pp. 1–20, 2001.
- [19] K. Metaxiotis and J. Psarras, "Applying knowledge management in higher education: The creation of a learning organisation", **Journal of Information and Knowledge Management**, Vol. 2, no. 4, pp. 353–359, 2003.
- [20] Riga Technical University, **Riga Technical University Strategy 2014-2020**, Riga, 2014.
- [21] A. Jashapara, **Knowledge Management: An Integrated Approach**, Vol. 62, no. 2, 2004.
- [22] T. H. Davenport, D. W. De Long, and M. C. Beers, "Successful Knowledge Management Projects", **Sloan Management Review**, Vol. 39, no. 2, pp. 43–57, 1998.
- [23] J. Rowley, "Is higher education ready for knowledge management?", **The International Journal of Educational Management**, Vol. 14, no. 7, pp. 325–333, 2010.
- [24] M. García-Murillo and H. Annabi, "Customer knowledge management", **Journal of the Operational Research Society**, Vol. 53, no. 8, pp. 875–884, 2002.
- [25] I. Nonaka and H. Takeuchi, "The Knowledge-Creating: How Japanese companies create the dynamics of innovation", **Oxford University Press**, Vol. 3, no. 4–5, pp. 25–27, 1995.
- [26] Webfinance Inc, "Business Dictionary", **The Internet's Most Comprehensive Business Dictionary**, 2007, <http://www.businessdictionary.com/definition/ambition.html%5Cnhttp://www.businessdictionary.com/definition/strategic-leadership.html> [electronic source]
- [27] Cambridge, "Cambridge Online Dictionary", **Cambridge University Press 2015**, 2015, [titlehttp://dictionary.cambridge.org/dictionary/english/interest](http://dictionary.cambridge.org/dictionary/english/interest) [electronic source]
- [28] N. Milton, **Metrics in Knowledge Management**.
- [29] R. S. Kaplan and D. P. Norton, "The Balanced Scorecard - Measures That Drive Performance", **Harvard Business Review**, Vol. 70, no. 1, pp. 71–79, 1992.