THE "ENTERPRISE ARCHITECT" – A NEW APPROACH TO BUSINESS INFORMATICS MANAGEMENT

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1 INTRODUCTION

With the development of Information and Communication Technologies (ICT), both the requirements for the expertise of the line managers and the professional managers in departments and sections of the corporate ICT are changing. In this respect, it is important to answer the questions connected with the changes to competences and qualifications of the ICT expert staff. Qualifications and competencies can be investigated from many points of view. Of these is, for instance, the view of the factors influencing the fluctuation of staff in companies (Joseph, et al., 2007), or the total concept of ICT competencies for managers prepaFqured by the Council of European Professional Informatics Societies (CEPIS, 2012e). Other concepts, which rather have the character of executive views, can be found, for example, in Vodacek and Vodackova (2001), Veber (2009), Doucek, et al. (2011), Glova, et al. (2011). A certain partial view of the requirements, knowledge and competences of the role "Enterprise Architect" in companies is also presented in the articles (Gala & Jandos, 2010) and in (Sudzina, et al., 2011). In the current economic practice and also thanks to the changes of economic conditions, also the roles of ICT professionals in companies are changing (Kunstova, 2011). The ICT Architect role is becoming more and more important in current companies as one of the roles that significantly interconnect the top management level with the ICT management. (Roser, et al., 2011). In order to monitor the assessment of the different ICT roles in practice, we searched for adequate basis. The concept offered in the paper (Joseph, et al., 2007) allows for understanding the view of the ICT experts on the labor market and of their conduct as an incremental structure shown in Fig 1.

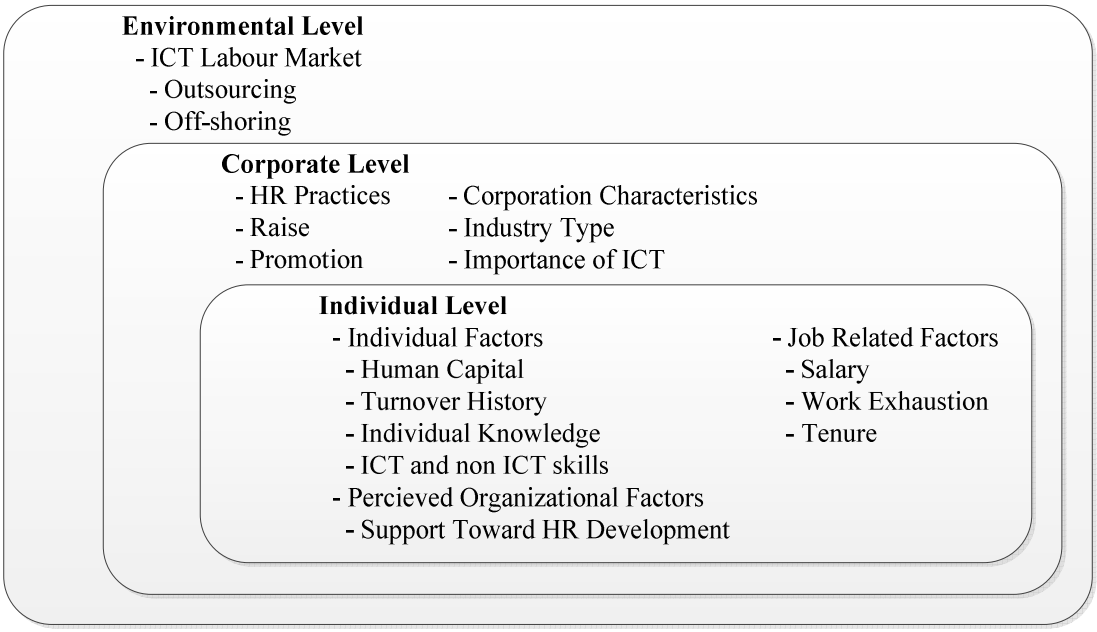

Figure 1 – Research Framework for Turnover of ICT Professionals source: (Joseph, et al., 2007)

This structure comprises the combined effect of three levels (Figure 1) – **the neighborhood of the company** in the form of labor market's effects, **the company's own attributes** such as its culture, human resources management, importance of ICT for the company, its size and economic strength, etc., and last but not least, also **the individual parameters of an individual**, such as his/her knowledge and skills, both in the ICT area and elsewhere (non-ICT). The splitting of knowledge into ICT and non-ICT was quoted, for instance, in the article Fernandez (2006). Based on this concept, we primarily dealt with the individual parameters of individuals, in particular in the role "Enterprise Architect" in the corporate practice. In order to be able to investigate the requirements of the Czech market for the different roles in ICT, first we had to define those roles. The main source for definition of roles was, on the one hand, the theoretical information provided in particular by the Council of European Professionals Informatics Societies (CEPIS), which is a significant international institution active in the field of research in the area of ICT professionals for many years. Members of this organization are national organizations dealing with the issues of knowledge and skills of ICT professionals. In their analyses, CEPIS define 21 main roles in the ICT area (CEPIS, 2012d), which are listed in Table 1.

Table 1 – ICT Professionals Roles source: authors, (CEPIS, 2012d)

IS Manager	**IS Auditor**
Enterprise Solutions Consultant	Business Analyst
Logistics & Automation Consultant	Sales and Application Consultant
Client Manager	Information Systems Project Manager
IT Systems Architect	Information Systems Analyst

IS Manager	IS Auditor
Web &Multimedia Master	Systems Integration &Testing Engineer
Software Developer	Database Manager
X-Systems Engineer	Telecommunications Architect
Security Adviser	Network Manager
Data Center & Configuration Manager	Help Desk Supervisor
IT Trainer	

Each of these roles is characterized by a detailed description, which is available on the CEPIS website (CEPIS, 2012d).

In view of the large number of the roles, only the most important are always selected within individual investigations. These roles include the roles IT Manager, IT Quality Manager & Auditor, IT Project Manager, Software Developer, Integration & Testing Engineer, IT Security Manager, Service Support Manager, IT Trainer (CEPIS, 2012a; CEPIS, 2012b; CEPIS, 2012c). Detailed description of all of the aforementioned roles can also be found on the CEPIS website (CEPIS, 2012d). At this place, we emphasize that one of the most important roles is "IT Quality Manager" in current time; especially in organization structures which are responsible for implementation and compliance of an management system based on international norms for example Information Security Management System based on ISO/IEC 27001:2005, Service Management System based on ISO/IEC 20000-1:2011, Quality Management System based on ISO/EN 9001, Systems and software engineering -- Software life cycle processes on ISO/IEC 12207:2008 and others. The documents of the association CEPIS were complemented by another theoretical resource for our survey, which specifies the hierarchical structure of ICT roles in the company and therefore, derives the inclusion of the role "Enterprise Architect" in the modern concept of corporate ICT management – Figure 2.

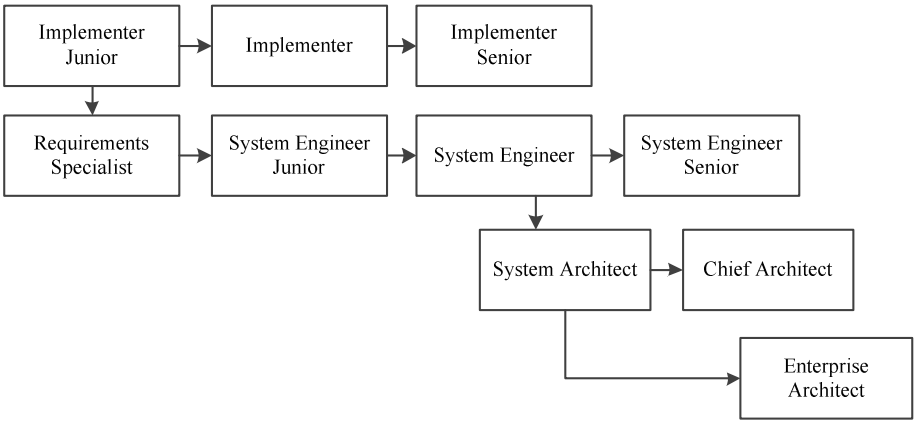

Figure 2 – Career Path of the Enterprise Architect Role source: (SEICMU, 2009)

Figure 2 implies that the knowledge and skills the role must possess cover multiple information systems and in more structured companies, also their different core businesses. According to (SEICMU, 2009), the role "Enterprise Architect" is jointly responsible for the process of investment decisions the objective of which is promotion of achieving the corporate mission and strategy. This includes both the identification of potential investment programs, i.e., for instance, the development in the area of hardware and software, but also identification of errors in managing the company's ICT platform that cause the company not achieving its mission and strategy. In the context of Figure 2 , the role "Enterprise Architect", which is in the document (SEICMU, 2009) also named "Engineering Technical Advisor", is a team of managers who decide on the investments in ICT in the companies. Furthermore, the Enterprise Architect is in charge of measuring and modeling of business processes and decides if the current characteristics of the processes support the corporate strategy and considers and evaluates how investments in ICT could improve the achievement of the corporate strategy. This implies that the Enterprise Architect is responsible both for the area of analysis and the area of design (SEICMU, 2009). This responsibility is also confirmed by source (Opengroup, 2012), which requires almost all knowledge of the Enterprise Architect at the maximum level – Expert. Source (Opengroup, 2012) specifies the different knowledge and skills for the roles of corporate ICT system architects as follows. They break them down into:

- Framework Skills Areas – leadership, teamwork, inter-personal skills, oral communications, written communications, logical analysis, stakeholder management, risk management,
- Business Skills and Methods – business case, business scenario, organization, business process, strategic planning, budget management, visioning, business metrics, business culture, legacy investments, business functions,
- Enterprise Architecture Skills – business modeling, business process design, role design, organization design, architecture principles design, data design, application design, system integration, IC|T industry standards, service design, architecture views and viewpoints design, building block design, solutions modeling, benefits analysis, business interworking, systems behavior, project management.

Further data included detailed investigations carried out in cooperation with Czech professional organizations and associations, such as SPIS (Association for Information Society), CACIO (Czech Association of Chief Information Officers) and ČSSI (Czech Society for Systems Integration).

This article does not cover the issues of the impact of the ICT and education on the GDP and economic efficiency of corporate ICT, which are covered in detail,

for instance, in Delina & Tkac (2010), Dorcak & Delina (2011), Doucek (2010), Maryska (2008), and Hanclova & Doucek (2011).

2 STATEMENT OF PROBLEM

The objective of our survey, which focused the requirements, knowledge and competencies of Czech companies for the different roles of ICT professionals, was to state the requirements of the practice on the different ICT roles, broken down according to the company size and the importance of ICT for the company as a whole.

The objective of this article is to present the results of the survey for the role "Enterprise Architect", i.e., to show the requirements for knowledge for this new role under the conditions of the Czech Republic, both from the viewpoint of the company size and the importance of ICT for it.

We decided this role according to an analysis of the needs of the ICT professionals' labor market. Although there is a lack of professionals in all roles, the role "Enterprise Architect" is specific in many aspects and its demand is growing in particular in recent years, due to the necessity of achieving deeper connection of all management levels and increased efficiency of ICT deployment in the company's processes, and further in the definition of the integral concept of analysis and design of the corporate information system (Demirkan & Dolk, 2011). Details can be found, for instance, in (CIO (2007), SEICMU (2009), NUS (2009), Brown (2011) and others who deal with the general properties and skills of the role "Enterprise Architect".

3 DATA COLLECTION AND METHODOLOGY

In order to propose suitable roles of ICT professionals, we had to define who we view as an ICT professional. We consider to be an ICT professional any employee whose job requires specific ICT skills and knowledge on development, deployment, operation and utilization of ICT in the application area. Working with ICT forms the main contents of his/her job (OECD, 2010). We do not consider ICT professionals to be end-users of ICT, who by their specialized activities do not influence the work of other users with ICT. The reason for excluding the end-users from the group of ICT professionals is the fact that more and more professions (doctors, financiers, architects, accountants, etc.) use ICT in their work and results from this survey, focused only on ICT professionals, could thus be distorted. For the survey to be successful, we had to solve many less significant problems, which, however, had in their consequence key impact on the success of the survey among Czech companies. These were first of all the following:

- definition of ICT roles which would be based on general and internationally used principles as well as reflecting the specifics of the Czech ICT labor market,
- definition of the knowledge domains and determining the method for measuring the knowledge in them,
- determination of the method of data collection among economic entities and the method for evaluation of the collected data.
- The solution of these issues is the subject-matter of the section on data collection and methodology in the following text.

3.1 Definition of Roles

According to consultations between the staff of the University of Economics in Prague (UEP) and the staff of professional ICT associations, we formulated for the purposes of our survey the roles of ICT professionals listed in Table 2. The roles thus obtained we compared to the roles defined by CEPIS. Although the sets intersect in certain roles, this does not apply to all roles. The mapping between both approaches (the most important roles as mentioned above were applied from CEPIS) is shown in Table 2.

Table 2 – Role Mapping Between University of Economics in Prague and CEPISsource: authors, (CEPIS, 2012d)

ICT roles of CEPIS	**ICT roles of UEP**
IS Manager	IS/ICT Development and Operation Manager
Information Systems Project Manager	
Business Analyst	Business Analyst
Information Systems Analyst	
IT Systems Architect	
Systems Integration &Testing Engineer	
Sales and Application Consultant	ICT Dealer
Software Developer	ICT Developer
Web &Multimedia Master	
Database Manager	Administrator of Applications and of ICT Infrastructure
Network Manager	
Data Center & Configuration Manager	
X-Systems Engineer	
IT Trainer	Lecturer in ICT

ICT roles of CEPIS	ICT roles of UEP
Enterprise Solutions Consultant	Enterprise Architect
IS Auditor	Investigation for these ICT roles was not carried out in the Czech Republic in 2010
Telecommunications Architect	
Security Adviser	
Help Desk Supervisor	
Client Manager	
Logistics & Automation Consultant	

On mapping the roles, we decided not to carry out the survey in the Czech Republic in 2010 for certain roles. This involves mainly the roles from the lower part of the Table 2, with the note "Investigation for these ICT roles was not carried out in the Czech Republic in 2010". The reason was the fact that we were primarily interested in the key roles, bearing the main burden of implementing information systems and ICT operation in most economic sectors.

Definition of the roles was then followed by determining their contents. For each role, we specified the main concrete positions in the companies that can be executed by this role, then we specified the related concrete key knowledge and then the key activities the representative of the role carries out in practice. For the purposes of this article it is not necessary to describe the contents of all the roles we included in the survey. Therefore, Table 3 only includes the requirements for key knowledge and main activities of the role "Enterprise Architect" also with respect to quality audit (Bober, 2000).

Table 3 – Definition of the Role "Enterprise Architect" source: authors

Enterprise Architect	**Key knowledge:**
Professions: • Enterprise architect • Solution architect	• design of the corporate business model, • design of main, control and support business processes, • design of IT support for business processes. **Activities:** • design of the business model, quality audit and optimally corresponding business processes and their links, • design of links between architectures (business architecture, IT services architecture, application architecture, information architecture and technology architecture) and reviewing their integrity, • definition and reviewing the criteria settings for evaluating the adequacy and efficiency of architectures.

3.2 Knowledge Categories and Levels

In cooperation with CACIO and SPIS, we formulated the requirements for required skills of ICT professionals, which are required from all roles. These include mainly a high level of creativity in problem-solving, good command of English (written and spoken), ability of teamwork and communication skills. Within the survey, we did not test the level of these skills.

On defining the skills, we defined the knowledge domains in the meaning of explicit knowledge. Here we defined that knowledge that is required for the different roles with various level of urgency. In cooperation with CACIO and SPIS and according to the description of ICT study majors in (Strawmann, 2004), we split them into the following sixteen ICT knowledge domains: "MS01 – Process modeling", "MS02 – Functionality and customization", "MS03 – Management IS/ICT", "MS04 – Analysis and design" (of the corporate information system as a whole and its parts), "MS05 – Software engineering" (techniques and procedures of software products development), "MS06 – Data and information engineering", "MS07 – IS/ICT knowledge", "MS08 – Operational excellence". Besides, we also monitored the required knowledge in non-ICT domains, which were as follows: "MS09 – Team leadership skills", "MS10 – ICT market knowledge", "MS11 – Organizational management methods", "MS12 – Enterprise finance and economics", "MS13 – Sales and marketing", "MS14 – Mathematics and statistics", "MS15 – Law", "MS16 – Knowledge in business sectors". (Maryska, et al., 2010)

The level of required knowledge for the different knowledge domains is expressed as days of intensive training in the respective area. The volumes of the companies' requirements are converted to a non-linear six-grade scale. The conversion method is defined as follows:

0 – **No expertise**,

1 – **General awareness of the issues** (corresponds to approximately 1–2 days of intensive training),

2 – **Basic orientation in the issues and terminology** (corresponds to approximately 3–5 days of intensive training),

3 – **Solid overview of the issues and basic practical skills** (corresponds to approximately 6–20 days of intensive training),

4 – **Solid overview of the issues and solid practical skills** (corresponds to approximately 21–40 days of intensive training),

5 – **Highest expertise** – in-depth current knowledge and advanced practical skills (corresponds to approximately 41 or more days of intensive training).

3.3 Data Collection – Questionnaire Survey

The survey was carried out via phone method CATI (Computer Assisted Telephone Interviewing) in combination with online survey.

The questionnaire for online and phone calls included the following groups of questions: Characteristic of the company – "dependency on information technologies" with values MIT, SIT and VIT, whether it is ICT supplier or user, if the owners of the company are domestic or international, what is the number of employees and identification of the sector according to OKEČ (Sector Classification of Economic Activities), requirements for knowledge broken down according to knowledge domains listed above. The knowledge required by the company were assigned to each of the seven defined process roles (see Section "Definition of roles" and further, for instance, (Doucek, et al., 2012), the required experience for each professional role, supplementary information on the average monthly salary in each professional role and the number of ICT professionals in the respective role who are employed by the company, including the forecast of the company as to their numbers in 2011–2015.

We based the survey among companies on the data in the Register of Economic Entities, maintained by the Czech Statistics Authority. As of 31 December 2005, the register contained a total of 2,388,490 entities, of which 1,266,336 entities were economically active. Economically active entities were the target group, which we further restricted by other selection conditions. On applying them, we selected a sample to be approached from the resulting set of economically active entities. The limiting and distinguishing conditions were as follows:

- Size of the economic entity, which is defined by the number of employees. For the purposes of the survey, we selected three categories of company size – 0–49 , 50–249, 250 or more.
- The industry which was used for determining the dependency on ICT in the company. According to the share of investment in ICT in the company's turnover, we divided the industry into three categories: industries with the weakest dependency (MIT), industries with medium dependency (SIT) and industries with the strongest dependency on use of ICT (VIT).

According to these conditions, we identified the numbers of economically active entities broken down by size and economic industry.

In deciding on the size of the selection set, we assumed that the simplest, i.e., proportionate distribution into areas where the selection shares are the same in all areas, would not be suitable in this case. The areas in the master set have significantly different sizes. We decided to reflect this fact as follows: in the group of the largest entities (over 250 employees), which are the least, exhaustive survey would be taken. In the industries dependent on information technologies,

exhaustive survey would be taken also for entities over 50 employees. In the other areas, we defined the selection scopes to be equal with respect to the company size and increasing as to the dependency of the industry, which can be regarded as more significant in that respect. Using the rules thus defined and on consulting the company carrying out the actual survey among the companies, we proposed the selection set with the structure and numbers as shown in the following Table 4.

Table 4 – Structure of the Observed Sample 2010 source: authors

Size of Entities / Category of Industry	0 – 49	50 – 249	250 +	Total
MIT	45	46	44	**135**
SIT	57	474	98	**629**
VIT	66	142	39	**247**
Total	**168**	**662**	**181**	**1,011**

Surveyed data:

- Number of ICT professionals in the economic entity in 2010 broken down into seven roles.
- Expected number of ICT professionals employed in the economic entity in the next five years.
- Requirements for the level of knowledge in the different jobs broken down into 16 knowledge domains.
- Other variables influencing the entities and their requirements for ICT professionals are: number of employees, economic sector in which the entity carries out its economic activities, requirements of the economic sector for the ICT, ICT suppliers for the entities, ICT customers of the entity, domestic or international owners of the entity.
- Requirements for knowledge of the different roles.

3.4 Evaluation Methodology

We evaluated the obtained data using the platform Microsoft SQL Server 2008 R/2, which possesses functionality important for our purposes, namely the ETL (Extract – Transform – Load) tools, the tools for generating multidimensional solutions and tools for data mining. A separate group of tools was the application Microsoft Excel.

We used the ETL tools for processing the input data files, which we imported, using them, in the relational data model of our design, over which we built a multidimensional solution. The main dimensions of our solution, which we used for the analysis of the responses, were the main parameters of the approached companies. An example is the number of employees, dependency on ICT, industry, region of activity, etc.

We did not use the data mining tools during primary processing and evaluation of data obtained from the companies, but we used them in later evaluation steps, for which we created proprietary data mining models, which enabled us to discover mutual dependencies in the respondents' answers. However, the issues of creating business intelligence and data mining models goes beyond the scope and objective of this article, and therefore, for detailed information, we refer on a general level to Pour et al. (2012), Kimball (2002) and in detailed focus of this article's issues in the book (Maryska,et al., 2012).

The last tool – Microsoft Excel, we used for the presentation of the obtained survey results. For presenting them, we found as the most suitable the spider charts, which are also included in this article.

4 RESULTS

According to a survey carried out in 2010, we selected certain results among the economic entities for the role “Enterprise Architect” that focus mainly the differences in understanding of that role by companies, which differ in dependency of their core business on information technologies and in their sizes.

Interesting statistics is provided by the view of the role “Enterprise Architect” in various dimensions of the analyzed companies. These figures can be translated as understanding of the importance put on this role in the companies. The total numbers of roles of all 1,011 analyzed companies are shown in Table 5.

The sum total in the different view is not 1,011, i.e., the total number of companies, as a large number of companies do not distinguish or require the role “Enterprise Architect”, and thus did not define any requirements for that role.

Table 5 – Numbers of Companies Responding the Role “Enterprise Architect”source: authors

Size		**Dependency**	
<50	8	**MIT**	12
50-249	41	**SIT**	36
250+	35	**VIT**	38
Total	**84**	**Total**	**86**

4.1 Equirements for the role "Enterprise Architect" by the Dependency of the Companies on ICT

In this area, our survey obtained 86 responses, which were split up depending on the dependency of the industry on ICT (Table 5). In order to achieve detailed description of each company include in the survey, we requested answers to 118 questions in the survey. The following Table 6 shows statistical characteristics identified from the data during our survey.

Table 6 – Companies Requirements on the Role "Enterprise Architect" According to the Dependency on ICT source: authors

	VIT n= 38						SIT n= 36						MIT n= 12					
	Med	Avg	Σ	σ^2	δ	τ	Med	Avg	σ	σ^2	δ	τ	Med	Avg	σ	σ^2	δ	τ
MS01	4.0	3.69	1.28	1.65	-1.10	1.00	3.5	3.42	1.05	1.11	-0.47	-0.02	4.0	3.75	1.22	1.48	-1.25	1.33
MS02	4.0	3.50	1.11	1.23	-0.87	1.38	3.0	3.31	0.89	0.79	-0.40	0.13	4.0	3.58	1.08	1.17	-1.54	2.28
MS03	4.0	3.58	1.16	1.34	-0.74	1.06	3.0	3.28	1.16	1.35	-0.58	0.55	4.0	3.58	1.00	0.99	-1.60	3.83
MS04	4.0	3.94	1.07	1.14	-1.53	3.97	4.0	3.67	1.01	1.03	-0.48	-0.80	4.0	3.83	1.03	1.06	-2.01	5.58
MS05	3.0	3.09	1.22	1.49	-0.69	0.16	4.0	3.44	1.00	1.00	-1.21	2.79	4.0	3.50	1.24	1.55	-0.85	-0.09
MS06	3.0	3.37	1.11	1.24	-0.54	1.07	3.0	3.44	1.05	1.11	-0.39	0.05	3.5	3.42	1.31	1.72	-0.36	-0.76
MS07	4.0	3.50	1.11	1.23	-0.87	1.38	4.0	3.53	1.18	1.40	-1.06	1.10	4.0	3.42	1.24	1.54	-0.63	-0.34
MS08	4.0	3.54	1.15	1.31	-0.86	1.16	4.0	3.36	1.27	1.61	-0.74	0.08	4.0	3.58	1.00	0.99	-1.60	3.83
MS09	4.0	3.39	1.13	1.27	-0.84	0.72	3.0	3.00	1.26	1.60	-0.72	0.33	3.5	3.42	1.00	0.99	-1.05	2.55
MS10	3.0	3.46	1.07	1.14	-0.73	1.92	3.0	2.97	1.25	1.57	-0.59	0.22	4.0	3.67	1.23	1.52	-0.99	0.65
MS11	3.0	3.22	1.17	1.38	-0.68	0.51	3.0	3.03	1.23	1.51	-0.74	0.60	4.0	3.50	1.17	1.36	-0.82	0.61
MS12	3.0	2.81	1.04	1.08	-0.56	0.66	3.0	2.67	1.12	1.26	-0.83	0.65	3.5	3.42	0.90	0.81	-0.15	-0.43
MS13	2.5	2.56	1.11	1.22	-0.02	-0.15	2.0	2.31	1.28	1.65	-0.18	-0.47	3.0	3.17	1.11	1.24	-0.39	-0.05
MS14	3.0	2.74	1.29	1.67	-0.10	-0.64	3.0	3.03	0.94	0.88	-0.28	-0.34	3.0	2.92	1.38	1.90	0.18	-1.00
MS15	2.5	2.61	1.15	1.33	-0.23	0.00	3.0	2.50	1.23	1.51	-0.19	-0.55	3.0	3.00	1.28	1.64	-0.31	-0.86
MS16	4.0	3.58	1.18	1.39	-0.98	1.31	3.0	3.00	1.31	1.71	-0.57	0.05	4.0	3.75	0.87	0.75	-0.44	0.23

The data set for companies dependent on ICT (VIT) is relatively consistent. The largest deviation shows kurtosis (τ) for the domain "MS04 – Analysis and design", which means that the obtained values were more dominantly (compared to normal distribution) distributed around the average. Negative values of skewness (δ) for all the monitored domains mean that the obtained average values are moved towards the maximum monitored value.

The companies with medium dependence on ICT (SIT) show very similar consistent characteristics. Negative values of skewness (δ) of all the monitored domains mean that the obtained averages are moved towards the maximum monitored value. The largest deviation of kurtosis (τ) has the domain "MS05 – Software engineering", which means that the obtained vales were distributed more around the average than in extreme values compared to the normal distribution.

The companies with low dependency on ICT (MIT) then have significantly less consistent characteristics than the previous sets. The first group are the knowledge domains "MS01 – Process modeling", "MS02 – Functionality and customization", "MS03 – Management IS/ICT" and "MS04 – Analysis and design", where the value of kurtosis is higher than 1. For the domain "MS04 – Analysis and design", the kurtosis (τ) is significantly positive at 5.58, which corresponds to the fact that a small fraction of respondents agreed on values very close to the average value. The negative value of skewness (δ) indicates deviation of the obtained values towards the maximum value. As to kurtosis, very similar situation is with the domains "MS08 – Operational excellence" and "MS09 – Team leadership skills".

The results regarding the requirements for the different knowledge domains are shown in Figure 3.

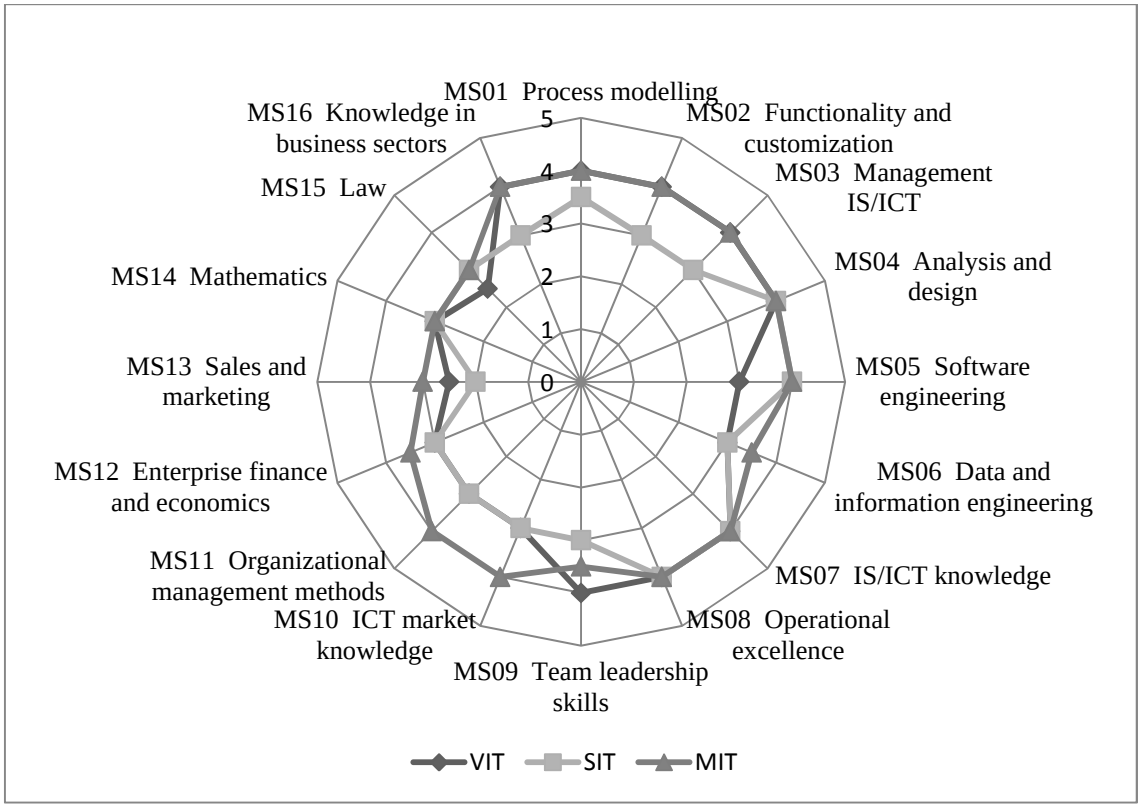

Figure 3 – Companies Requirements on the Role Enterprise Architect According to the Dependency on ICT source: authors

Note: The identified median values for each knowledge domain are shown in Figure 3.

Figure 3 implies that the requirements for the role "Enterprise Architect" depending on the importance of ICT for the industry:

- Are practically in all the knowledge domains at a level between 3 and 4 – i.e., the requirements are uniform regardless of whether these involve ICT knowledge or non-ICT knowledge.
- They are the highest in companies with low dependency on ICT – here we have a working hypothesis that in such companies, it is necessary for the Enterprise Architect to possess summary knowledge as the company cannot afford more specialists in ICT and this role is ideal for a sum of strategic and tactical executive positions in the company's ICT. We will try to verify this conclusion from the collection of data in the following survey, which will be focused in a more detail on the role "Enterprise Architect" and will be carried out in the second half of 2012.
- For the companies that provided their responses in the survey, it further holds (small number of respondents who have such a role implemented in their managements) that the role "Enterprise Architect" is not, in their opinion, essential for the companies as neither the ICT plays any key role for the core business proper. Therefore, orchestration of applications in the company is not necessary, either.
- They are in companies heavily dependent on ICT for all the monitored ICT domains median 4, except "MS05 Software engineering" and "MS06 Data and information engineering", which indicate the median value of 3.

4.2 Requirements for the Role "Enterprise Architect" by Company Size

Further dependency we monitored in our survey was the requirements for the role "Enterprise Architect" the companies have depending on their size. Therefore, we split the companies in the Czech Republic into three groups – small companies and micro companies up to fifty employees (< 50 employees), medium-sized companies between 50 and 249 employees (50–249 employees) and large companies over 250 employees (250+ employees). Statistical characteristics of the obtained data for each monitored group are shown in Table 7.

Table 7 – Companies Requirements on the Role "Enterprise Architect" According to the Number of Employees source: authors

	250+ employees n= 35						**50-249 employees n= 36**						**<50 employees n= 12**					
	Med	**Avg**	**Σ**	**σ^2**	**Δ**	**τ**	**Med**	**Avg**	**Σ**	**σ^2**	**Δ**	**τ**	**Med**	**Avg**	**σ**	**σ^2**	**δ**	**τ**
MS01	4.0	3.86	0.88	0.77	-0.26	-0.67	4.0	3.44	1.29	1.65	-0.60	-0.59	3.5	3.13	1.55	2.41	-1.19	1.65
MS02	4.0	3.77	0.81	0.65	-0.61	0.30	3.0	3.20	0.95	0.91	-0.41	-0.15	3.0	3.13	1.64	2.70	-0.78	0.87
MS03	4.0	3.69	0.83	0.69	0.02	-0.57	3.0	3.34	1.26	1.58	-0.53	-0.09	3.0	3.00	1.51	2.29	-0.99	1.66
MS04	4.0	4.00	0.80	0.65	-0.72	0.57	4.0	3.76	1.09	1.19	-0.70	-0.30	3.5	3.25	1.49	2.21	-1.60	3.62
MS05	4.0	3.43	1.07	1.13	-0.65	-0.10	3.0	3.30	1.07	1.14	-1.05	1.65	3.0	2.75	1.67	2.79	-0.46	-0.60
MS06	4.0	3.69	0.90	0.81	-0.08	-0.72	3.0	3.33	1.14	1.30	-0.25	-0.41	3.0	2.63	1.41	1.98	-0.34	2.05
MS07	4.0	3.86	0.88	0.77	-0.81	0.34	4.0	3.32	1.21	1.47	-0.65	0.13	3.0	2.88	1.46	2.13	-0.82	2.00
MS08	4.0	3.77	0.81	0.65	-0.26	-0.23	4.0	3.33	1.31	1.71	-0.64	-0.29	3.0	2.88	1.55	2.41	-0.64	0.59
MS09	4.0	3.51	0.95	0.90	-0.59	0.24	3.0	3.05	1.26	1.60	-0.72	0.06	3.0	2.88	1.46	2.13	-0.82	2.00
MS10	3.0	3.51	1.04	1.08	-0.87	2.54	3.0	3.15	1.23	1.52	-0.47	-0.12	3.0	2.88	1.55	2.41	-0.64	0.59
MS11	3.0	3.23	1.24	1.53	-0.56	0.07	3.0	3.17	1.12	1.25	-0.81	0.80	3.0	3.00	1.51	2.29	-0.99	1.66
MS12	3.0	3.11	0.99	0.99	-0.05	-0.83	3.0	2.71	1.05	1.11	-1.12	1.33	2.5	2.25	1.28	1.64	-0.61	-0.02
MS13	3.0	2.74	1.19	1.41	-0.03	-0.38	3.0	2.43	1.24	1.53	-0.29	-0.50	2.0	2.25	1.16	1.36	-0.63	1.74
MS14	3.0	3.11	1.02	1.05	-0.07	-0.26	3.0	2.78	1.17	1.36	-0.05	-0.91	2.5	2.50	1.60	2.57	0.00	-0.31
MS15	3.0	2.97	0.98	0.97	0.26	-0.68	3.0	2.46	1.25	1.55	-0.24	-0.53	1.5	1.88	1.46	2.13	0.65	-0.73
MS16	4.0	3.49	1.15	1.32	-0.95	1.45	3.0	3.24	1.24	1.54	-0.57	-0.02	3.5	3.38	1.60	2.55	-1.38	2.67

The data of companies larger than 250 employees are relatively very homogeneous. An exception is the distribution of data in the domains "MS10 – ICT market knowledge" and "MS16 – Knowledge in business sectors", where the kurtosis parameter (τ) indicates high concentration of response values close to the average. Slightly negative skewness (δ) of the data indicates very slight tendency of the identified values towards the maximum.

For the companies with 50–249 employees, the data is also relatively homogeneous. Slightly negative skewness (δ) was identified for all domains – that means that the identified values have a tendency of slight inclination towards the maximum value. The value of kurtosis was, except two domains, indicated in the range between +1 and -1. Two domains with higher kurtosis values are "MS05 Software engineering" and "MS12 Enterprise finance and economics". For these it holds that most respondents responded the questions with values of the surveyed parameters very close to the average.

The data set for small companies and micro companies (up to 50 employees) is relatively small, therefore, also their statistical characteristics are not very homogeneous. For all domains, the calculated values of both the standard deviation (σ) and dispersion (σ2) are significantly higher than in previous cases. Another moment characteristic – skewness (δ) is negative for all the knowledge domains – for two domains, the value of skewness is significantly higher than for the other. These are the domains "MS04 Analysis and design" and "MS16 Knowledge in business sectors". The values of kurtosis are significantly positive

in nine knowledge domains, which means that the identified values occurred largely close to the average.

The requirements for the knowledge domains for the role "Enterprise Architect" by company size are shown in the following Figure 4.

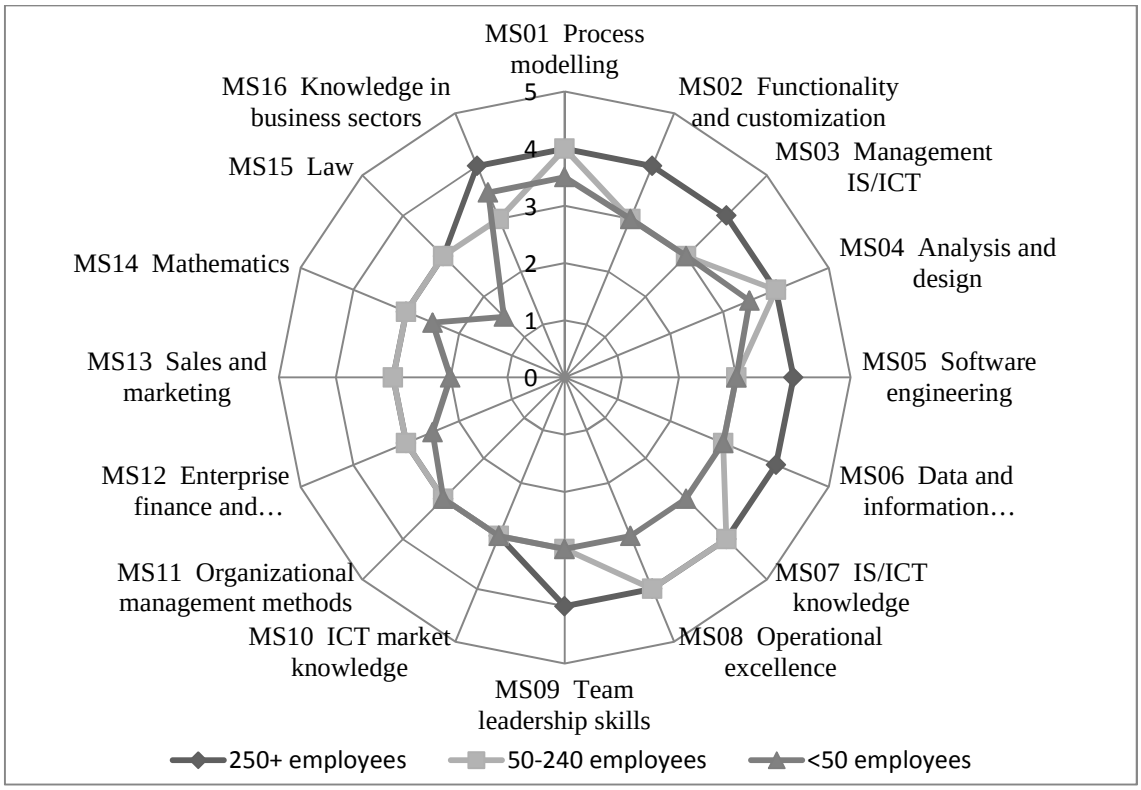

Figure 4 – Companies Requirements on the Role "Enterprise Architect" According to the Number of Employees source: authors

Note: The identified median values for each knowledge domain are shown in Figure 3.

Figure 4 implies that the requirements for the role "Enterprise Architect" depending on company size:

- Are the highest in companies with more than 250 employees, where more demands are put on that role, in particular in the area of ICT knowledge, and high requirements are also connected with the domain "MS16 Knowledge in business sectors". It indicates for it is important for large companies that the incumbent in the role "Enterprise Architect" should possess good knowledge of the company's own core business. Besides, the requirements from that role are also higher in the area of leadership skills – the knowledge domain "MS09 Team leadership skills".
- Are the lowest in all knowledge domains (except the domain "MS16 Knowledge in business sectors") in companies up to 50 employees. The working hypothesis is that in small companies, the role "Enterprise Architect" also executes activities related to the company's own core

business. What is surprising are very low requirements in small companies for the domain "MS15 Law". From that we deduce that legal services are mostly outsourced in those companies and therefore, it is not necessary to have this type of knowledge in the company directly.

- Companies with sizes between 49 and 250 employees put maximum requirements on the domains "MS01 Process modeling", "MS04 Analysis and design", "MS07IS/ICT knowledge" and "MS08 Operational excellence". It implies that main requirements of medium-sized companies are primarily on process modeling, analysis and design of the corporate information system, of its sections as well as the concept of the information system as a whole. Besides, he/she is also subject to requirements in the area of the company's information system operation connected with the knowledge of ICT.

In general, it can be said that the companies require for the role "Enterprise Architect" a relatively complex level of knowledge. These requirements are dominated by ICT knowledge, though also the level of requirements for non-ICT knowledge is high.

5 CONCLUSIONS

The role "Enterprise Architect" is relatively new on the labor market in the Czech Republic, and therefore, we surveyed the requirements of the practice for this new role on domestic market in an investigation that took place among economic entities in 2010. According to our survey, the importance of this role in routine management consists in the following activities:

- must formulate and retain the vision of the corporate ICT development and must be able to manage its development in the desired direction implied by the overall strategy of the company,
- is the vector of innovations in the company:
  - primary innovations in the corporate ICT,
  - secondary innovations from the corporate ICT and the deployment of ICT in the company to its internal processes,
- realizes the link between the corporate strategy and its projection in the corporate ICT and its deployment,
- is the author of rethinking the business processes in ICT deployment,
- is the holder of conceptual development of the whole corporate ICT,
- identifies and manages the risks related to ICT development and maintenance,

- identifies and manages problems related to ICT development.

The companies who put relatively high requirements on the knowledge connected to the role "Enterprise Architect" must at the same time realize that it is no easy task to find and hire such a professional. It puts increased demands on the recruitment process or necessitates to develop such a professional internally.

This survey was part of a larger project, which included a survey in universities (Doucek, et al., 2012). Its objective was to identify the knowledge possessed by fresh graduates leaving universities in the Czech Republic for corporate practice. In it, we came to a conclusion that the current situation of universities does not include enough majors that would prepare professionals for the role "Enterprise Architect" (for more detailed analysis see, for instance, in (Gala & Jandos, 2010). In our opinion, this is caused by the fact that the role "Enterprise Architect" unifies in it the requirements for both theoretical knowledge and for experience obtained by a prolonged practice in real situations of managing corporate ICT. Therefore, mere theoretical education in schools cannot provide such professionals exhaustively.

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