Competencies of Management Staff in the Knowledge-Based Economy

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Peer reviewed by

Małgorzata Gableta Anna Rakowska

Edited and proofread by

Anna Małgorzata Grzybowska

DTP by

Zuzanna Helis

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Introduction

The Polish management staff and enterprises they manage face now growing challenges which originate from dynamic economic, technologic, civilisation and cultural changes.

On one hand, these changes generate large opportunities of profits and development, on the other hand – they increase risks, reducing time for reaction and making committed mistakes more costly and their consequences less predictable. This fact has been confirmed by recent negative economic situation in many countries and worldwide crisis. Experiences of developed countries show that chances of survival and success are the greatest for those economies which are based on knowledge. Statistical data and international evaluations1 confirm that the Polish economy cannot be considered an entirely knowledge-based economy yet and there is still a large distance between it and many countries of the European Union or OECD². As a result, only some enterprises have the features of knowledge-based organisations. However, it seems necessary that future changes should take this direction. Undoubtedly, an important role will be played by management staff. The transformation to the knowledge-based economy sets new requirements for them. Many studies³ indicate a competencies gap and certain misadaptation of management staff to operating in the knowledge-based economy; as a result, managerial education is increasingly criticised. A lot of attention has been paid to management staff's competencies in research, although much less effort was devoted to their correlations with corporate results. Studies concerning these issues within the knowledge-based economy are missing so far. This subject has become

¹ Cf. e.g. [Kukliński 2007; Kupczyk, Kubicka 2010a; Browne, Geiger 2010; Cisco 2010; Matuszewska, Piech 2011; OECD 2011; Education at a Glance ...2012; "Knowledge Economy Index" 2012; Dutta, Bilbao-Osorio 2012; Szczucka, Turek, Worek 2012; Górniak 2013; Hollanders, Es-Sadki 2013].

² Organisation for Economic Cooperation and Development.

³ Cf. e.g. [Kanter 2001; Reynolds, Vince 2004; Rakowska 2007; Longenecker, Neubert, Fink 2007, p. 145; Rogacki 2009; Użycki 2009; Jadczak 2009; Hamel 2009; Armstrong, Fukami 2009, p. 1-22; Giannakouris, Smihily 2010; Baczko 2009; Kupczyk, Kubicka 2010a; Kupczyk 2010b; Kupczyk, Cierniak- Emerych 2011; Rakowska 2011; Education at a Glance ... 2012; Górniak 2013].

more important in the context of reported deficient competencies of management staff, especially top management staff and in the context of better results achieved by knowledge-based economies and knowledge-based enterprises. An interesting research problem has appeared in the question: which competencies of management staff are crucial in the knowledge-based economy? For obvious reasons analysis of this issue in the environment of the Polish economy is especially interesting and important. Assuming three hypotheses, stating that:

- (H1): In the knowledge-based economy some competencies of management staff have become crucial.
- (H2): There are correlations between competencies of management staff and corporate results in the knowledge-based economy.
- (H3): There is a competencies gap in management staff concerning competencies which are crucial in the knowledge-based economy.

the meaning, responsibilities and human resources function of management staff should be viewed in a new way. This concerns especially selection of management staff, their motivation, development and interests. Identification of competencies which are crucial in the knowledge-based economy and their correlations with corporate results may be strategic for making the process of transformation of the Polish economy to the knowledge-based economy faster. This issue is interesting also because in the knowledge-based economy it is management staff above all that determines enterprises' survival and achievement of better results. Therefore, this book attempts to respond to the newly appearing demand, especially that these problems have been scarcely analysed not only in the Polish literature, but in international publications, too. This considerations brought development of the main objective of the presented work, which was to identify key competencies of management staff in the knowledge-based economy. Three specific objectives were defined, too.

The first one was to identify correlations between competencies of management staff and corporate results in the knowledge-based economy.

The second one concerned determination of the competencies gap of management staff in the areas which are crucial in management in the knowledge-based economy.

The third objective was to develop a model of competencies of management staff which are crucial in the knowledge-based economy and which correlate with corporate results of enterprises listed in rankings.

The research held was also intended to develop conclusions, reflections and postulates concerning development of competencies of management staff, more efficient selection of managers and - or above all - drawing greater attention of researchers and professionals to competencies which are crucial in the knowledge-based economy. In order to achieve these goals, critical analysis of literature and original empirical research were applied. The term "competency" had not been defined clearly in the professional literature and it seems that the meaning of the term is constantly expanded by different authors. However, considering the aim of this book – firstly, the analysed competencies of management staff were limited to the crucial ones, i.e. psychological traits, knowledge and skills; and secondly - only those competencies were sought which are important or very important in management in the knowledge-based economy. According to the KAM methodology⁴ developed by the World Bank, knowledge-based economy is defined by such main elements as education and human resources, application of knowledge, innovation, information-communication technologies. In this book, the author focused on those areas, so it has become grounded to concentrate on crucial competencies of management staff which determine their application. They were used as a basis to construct a potential set of competencies for creation of a knowledge-based economy. Two methods were used to identify crucial competencies of management staff in the knowledge-based economy and their correlations with corporate results. The first one involved analysis of literature and allowed for comparison, analysis and even criticism of presented opinions; the other one was based on empirical qualitative-quantitative research with a questionnaire on a sample of 433 representatives of management staff of Lower Silesian enterprises. The respondents were asked to indicate those competencies which they found crucial in management in the knowledge-based economy and to decide which of those were their strengths. Significance

⁴ Knowledge Assessment Methodology, cf. The World Bank [online], info.worldbank.org/etools/kam2/kam page5.asp [accessed: 13.01.2011].

and strength of competencies was assessed in pre-defined five-grade scales. The research concerned both significance and strength of competencies, because it was possible that a respondent found a competency crucial in the knowledge-based economy, but they are not strong at it. Further, referring to the research objective it was planned to verify the competencies gap of the respondent management staff. This was achieved by comparison of significance of particular competencies held with those desired. By defining significance of particular competencies in the knowledge-based economy, the respondents allowed their comparison in postulate approach. The researcher attempted to identify differences in competencies of management staff in two groups. The first group consisted of management staff of enterprises listed in rankings⁵, which were also knowledge-based organisations, while the other group included enterprises outside rankings which were not knowledge-based organisations. It should be stressed that the criteria of eligibility for particular rankings were variable and not comparable, however in each case they took into account financial results developed according to the binding act on accounting⁶. It was assumed that if enterprises were listed in rankings, then it meant that they had achieved better results than those enterprises which were not on the lists.

Also, strength of correlations between those elements was verified, as well as occurrence of a tendency (trend). In selection of research sample, level of management and gender criteria were taken into account, too. The former was chosen, because the role of top management staff in the process of restructuring enterprises is crucial. Further, in the knowledge-based economy, significance of lower level management staff has grown markedly, so inclusion of this criterion seemed important. The criterion of sex was taken into account because of the need of greater participation of women in management and application of competencies they hold considering the current demographic changes which make worldwide deficiency of competent management staff even deeper. As shown by research, the knowledge-based

⁵ Enterprises listed in rankings were taken from such rankings as: the List of 2000 by *Rzecz-pospolita* daily, the List of 500 by *Rzecz-pospolita* daily, Gazele Biznesu ranking, Ranking of Lower Silesian Enterprises, Forbes Ranking of the Most Prestigious Hotels in Poland.

⁶ Act on Accounting of the 19th September 1994, later amended (Journal of Laws of 1994, no. 121).

economy encourage greater involvement of women in management [Kupczyk 2013c, p. 45-64], so they will cooperate with men on this field more and more frequently. Knowledge of strengths of women and men in management will enable more efficient application of their competencies.

The book includes six chapters. The first one presents discussion concerning definition of competencies, as well as of the knowledgebased economy and how to measure it. The Polish economy is confronted here with the situation of economies of the European Union and OECD. The chapter presents also a sort of misadaptation of competencies of Polish management staff to management in the knowledge-based economy. The second chapter presents the author's literature analysis. It shows the attempt to compare opinions on key competencies of management staff in the knowledge-based economy concerning psychological traits, knowledge and skills, as well as their correlations with corporate results. The third chapter describes empirical research, including objectives, hypotheses, methods and research sample. The study was a part of implementation of the research project entitled "Support for Development and Adaptation in Lower Silesia", co-funded by the European Social Fund and national public contribution within the "Human Capital 2007-2013" Operational Programme (contract no. UDA-POKL.08.01.02-02-065/08-00). Further, in the fourth chapter, broad results of the empirical research are presented, including opinions of management staff concerning key competencies in the knowledge-based economy, considering which of these competencies are their strengths. Stress has been put on presenting differences of competencies related to level of management and sex. Competencies gap has been identified, too, which makes management in the knowledge-based economy harder for the management staff. Fifth chapter shows correlations between competencies of management staff and corporate results in the knowledgebased economy, as identified in empirical research. In the last, sixth chapter the author presents changes of competencies of management staff toward the knowledge-based economy. It includes a confrontation of key competencies of management staff from: non-knowledge-based enterprises outside rankings and knowledge-based enterprises listed in rankings. This was

done considering competencies held and those required and needed in the knowledge-based economy.

The author was aware of the applied aspect of the discussed issues and reflected it in the developed model of key competencies of management staff and their correlations with corporate results of enterprises listed in rankings. Further, there is a comparison of key competencies of management staff from the planned economy to the market economy to the knowledge-economy, in order to capture the changes. In defining postulates, the author attempted to verify opinions, concepts and perspectives presented in the published professional literature concerning the analysed issues. The book is finished with conclusions, referring to the objectives set and indicating research problems and areas which require further in-depth research.

The author appreciates the great contribution made by the managers who took part in the study and thanks them for the time devoted and opinions shared. The author hopes also that the results of the research shall gain interest and will be applied, helping rationalise and improve the process of selection and training of modern management staff, and that they will contribute to faster transformation of the Polish economy into the knowledge-based economy. The book is dedicated especially to management staff of enterprises, but also to researchers interested in management competencies and to students.

CHAPTER 1. COMPETENCIES OF MANAGEMENT STAFF AND THE KNOWLEDGE-BASED ECONOMY – DIAGNOSIS

1.1. Competencies – terminology

Although a lot of attention is paid to competencies in scientific literature, they are still not defined unequivocally. It should be stressed that the attempts made to set the definition of this term have brought discussions, many objections, controversy or even complete disapproval. This means, first, that this area is not entirely identified yet and it requires further research; second, the interest in competencies does not decrease and their importance keeps growing, especially in the context of the developing knowledge-based economy. Until researchers reach an agreement, one is obliged to present different opinions and points of view. The term "competency" is used in many scientific domains, especially in humanities and social sciences, including management, sociology, psychology and pedagogy⁷. The resulting multi-disciplinary character of the term makes it more difficult to define and understand it in the context of methodology and systematics [Kotter 1982; Robotham, Jubb 1999; Rakowska, Sitko-Lutek 2000; Chełpa 2003; Sułkowski 2005; Oleksyn 2006; Rakowska 2007; Antczak 2008; Walkowiak 2008; Orczyk 2009]. The greatest differences of opinions occur when authors attempt to determine what elements (components) compose competencies. This variability has its sources undoubtedly not only in areas of knowledge represented by authors, but also in cultural and national differences, business and personal experience or opinions promoted

Regulation of the Minister of Science and Higher Education of the 8th August 2011 concerning areas of knowledge, scientific and artistic domains, as well as scientific and artistic disciplines (Journal of Laws of the 30th August 2011).

by such big organisations as the European Union or OECD⁸. Large interest and intensity of controversies are doubtlessly due to the current increase of importance of human resources. The issue is even harder, considering that competencies are not constant or permanent and that – as a dynamic structure – they evolve affected by transformations of economy and human life [Kwiatkowski, Symela 2001, p. 22]. An analysis of presented opinions permits a reflection that researchers do not get closer to achieving a single definition, but – on the contrary – they keep expanding the scope of the term's meaning. Some argue even that "searching for a single, common or universal definition or classification, if it is possible, would not lead to enriched knowledge or practical management" [Walkowiak 2008, p. 29].

Origins of scientific interest in competencies are often dated at 1973, when P. McClelland published his paper entitled "Testing for competencies rather than for 'intelligence'" [McClelland 1973], stressing that neither psychological tests, nor school certificates and grades predicted whether a person would succeed in their professional life or not. However, it is rightly mentioned [Orczyk 2009] that opinions developed by T. W. Schulz as early as 1971 [1971 1980 1987] had referred to competencies, too. Initially, the term "competencies" meant holding formal authorisations (rights), tasks and responsibilities attributed to a position held within an organisation [Pasieczny 1982; Kopaliński 1989; Dunaj 1996; Nogalski, Śniadecki 1998; Skorupka 2002; Chełpa 2003; Listwan 2005, p. 63; Moczydłowska 2008]. For instance, this approach is represented by definition of competencies provided by S. Chełpa in his dictionary of human resources [Listwan 2005, p. 63]. It said that competencies were a "set of tasks, authorisations and responsibilities attributed to an employee in relation to their position in the organisation's hierarchy, as well as their performance of work at a particular area of the organisation's functioning (e.g. human resources, finance or production) or temporary functions held (e.g. project management). An employee is equipped with competencies by the organisation and therefore they are external to the employee, imposed for a shorter or longer period of time. Only after competencies are undertaken by the em-

⁸ Organisation for Economic Cooperation and Development.

ployee, they may be subject to the process of learning and internalisation, becoming a part of the professional qualifications held by this employee" [Listwan 2005, p. 63].

Since the 1970s, the scope of this term has been changing and competencies have come to be associated rather with so-called capability to perform tasks, take roles and achieve required measurable results which are adequate to the position held in the organisation [Boyatzis 1981; 2008a; 2006b; Shroder 1989; Kanungo, Misra 1992; Louart 1995; Dunaj 1996; Levy-Leboyer 1997; Nosal 1997; McKenna, Beech 1997; Nogalski, Śniadecki 1998; McKenna 1999; Armstrong 2000; Pocztowski, Miś 2000; Konecki 2000a; Bassellier, Reich, Benbasat 2001; Świgoń 2002; Walkowiak 2004; Król 2006; Spendlove 2007]. Therefore, it was necessary to capture the aim of action and potential alternative behaviour which would allow for achievement of the predicted efficiency. According to this concept, competencies are a potential that exists inside a man and leads to such a behaviour which contributes to fulfilment of requirements for the post within the organisation's environment which in turn brings required results [Boyatzis 1982]. The necessary relation between action and good results is stressed here. T. Hoffman [1999] analysed literature and found that there were three basic opinions concerning understanding of competencies:

- competencies as visible capacity,
- certain standard of work of a person or qualitatively described result,
- competencies as attributes of a person.

In his opinion, competencies, on one hand, may be "outcomes", i.e. results to which we strive by training etc. On the other hand, they may be perceived as "input" variables. Then, we focus on the content of the training and we start from an estimation of initial profiles of the trainees, i.e. what features should the trainees have to perform their tasks well after the training [Hoffman 1999]. A. Pocztowski [2003] defines competencies as "the whole of a man's permanent features in causal relation with high/over-average professional results achieved by this person". J. M. Moczydłowska stresses the desired correlation of competencies with success of the organisation and the employee themselves. In her opinion, competencies are any traits and authorisations of employees and organisations which are

used and developed in the process of work, which contribute to achievement of organisation's goals and the coherent personal goals of employees [Moczydłowska 2008, p. 35].

Therefore, in the capacity-related approach, competencies depend on the level of input (knowledge, talents, skills, traits, motives, attitudes and values) and are measured by result analysis (actual behaviour and results) [Königová, Urbancová, Fejfar 2012, p. 131]. Some authors associate competencies with ability to perform tasks in general, without focusing on particular results. Among them, R. N. Kanungo and S. Misra [1992] define competencies as generalised features of an individual: emotional traits, intellectual features and orienting attitudes which assist in accomplishment of potential tasks. R. E. Boyatzis [1982] and C. D. Fogg [1999] expand this term to include internal and external limitations, conditions and relations involved in a profession or work.

Some authors stress that competencies are a determining factor not only for efficiency, but also for actions taken in new or difficult situations which require innovative and creative approach and entrepreneurship [Thierry, Sauret, Monod 1994; Pietrasiński 1994; Louart 1995; Levy-Leboyer 1997; McKenna, Beech 1997; Karpowicz, Szaban, Wawrzyniak 1998; 1999; Błaszczyk 1999; Konecki 2000a; Bassellier, Reich, Benbasat 2001; Wachowiak 2001; Oleksyn 2001; Orczyk 2009]. The latest theories concerning competencies focus on necessity to implement tasks and achieve certain efficiency (with competencies) in the broadly defined work environment, including processes, technology, markets, competition or production and services areas [Savaneviciené et al. 2008]. R. E. Boyatzis mentions that in the global economy it is important that management competencies required in one environment may be used elsewhere, too [Boyatzis 2008a]. In this approach, the term of competencies in usually construed in two ways. Firstly, it is understood as an ability to implement particular workrelated tasks efficiently or to achieve measurable, desired results; and secondly, as a capacity to carry out particular sample tasks [Armstrong 2000; Whiddett, Hollyforde 2003; Spendlove 2007]. The two described approaches are characteristic of the USA and United Kingdom. In the USA, the term has an individual nature and reflects importance of selection of employees

and significance of their motivation to achieve increased efficiency of operations of business entities. The key issue here is to define individual traits of particular employees so that they achieve the highest capacity at the given position. R. E. Boyatzis, who is perceived as the creator of this term, adapted it to the needs of enterprises which compete at markets by creating development opportunities for themselves and their employees with increased work efficiency achieved by correct selection of employees. Meanwhile, in Great Britain it is assumed that, with competencies minimal capacity standards can be increased nationwide in order to achieve planned results [Wood, Rayne 2006, p. 36-45]. According to J. Orczyk [2009, p. 26], currently, in the theory and practice of management, the American approach is getting more popular; it offers larger opportunities of adaptation to changing situations. However, because of flexibility in adaptation to the situation, to specific and variable organisational context, competencies are revealed only at performance of a specific job. This concerns especially functioning in the situation of uncertainty and variability, characteristic for modern times.

The opinions presented in modern professional literature describe three phases in the development of definition of competencies [Königová, Urbancová, Fejfar 2012, p. 131]. The first one focused on competencies of individuals [White 1959; McClelland 1973; Boyatzis 1982; Schroder 1989; Woodruffe 1992; Spencer, Spencer 1993; Carroll, McCracking 1998]. The second phase concerned management competencies in organisations (competencies models) [Mansfield 1996; McLagan 1997; Lucia, Lepsinger 1999; Rothwell, Lindholm 1999]. The third stage involves identification of basic competencies which compose a sum of key organisational competencies to be used in order to achieve competitive advantage [Prahalad, Hamel 1990; Ulrich, Lake 1991; Gallon, Stillman, Coates 1995; Coyne, Hall, Clifford 1997; Rothwell, Lindholm 1999; Delamare, Wintertone 2005].

In presenting opinions about defining competencies, one must not forget the fact that the term itself has gained appreciation of scientists and professionals who resolved to prefer it in analysis of management of human resources or even replace qualifications with it. Some authors and professionals have long used these terms as equivalent synonyms [Kozdrój 1993; Cienkowski 1994; Witkowski 1995; Achtenhagen 1998; Robbins 1998; Rybak

1998b; Nihof 1999; Sajkiewicz 1999; Lipka 2000; Kopertyńska 2000; Janowska 2002; Kraśniak, Roszyk-Kowalska 2002]. Lately, however, authors try to avoid the term of qualifications, which – according to Z. Antczak – has modified the meaning of competencies by expanding it [Antczak 2010, p. 17]. However, dictionaries and terminology analyses still present more similarities than differences. According to J. Orczyk, "this is related to underestimation of specificity of particular terms. Frequently, it is reflected in expansion of meaning of the preferred term, often without clear grounds. Yet it is important to (...) realise necessity of clear definition of the scope of meaning in using these terms, because this is the only way to use entire strengths of theories to explain changes in preparation and using people in the process of work" [Orczyk 2009, p. 20].

Qualifications are usually defined as specialist education, knowledge held, talents, experience and skills necessary to perform a specific profession or to work at a specific position [Pszczołowski 1978; Pasieczny 1982; Kopaliński 1989; Biczyński, Miedziński 1991; Dunaj 1996; Szaban 2000; Padzik 2002; Listwan 2005; Skorupka 2002; Walkowiak 2008]. This approach dominates clearly in papers concerning educational and professional background. For instance, U. Jedruszka perceives an overlapping, although different scopes of meaning of the terms qualifications and competencies and argues quite positively that: "qualification are a sort of starting point in striving to and achievement of professional competencies; qualifications and professional competencies are two states which supplement each other and make it possible to achieve professional mastery" [Jedruszka 2006, p. 63-67]. Other authors claim that qualifications are a condition of professional excellence or specific specialisation [Dolny, Meller, Wiśniewski 1990]. Other researchers differentiate qualifications revealed at work from those documented by relevant certificates, diplomas or statements. The former are referred to as professional ones and the latter – as formal ones [Listwan 1993; Unolt 1999]. Some authors prefer a somewhat narrow interpretation of this term. For example, P. Louart [1995] claims that qualifications are a part of competencies of an individual which is confirmed by diplomas or professional experience. Sometimes, they are defined more broadly as individual traits of a person necessary to perform efficiently the set of operations

typical for a job, specialisation or temporary position, but also allowing to work at similar professions [Pasieczny 1981]. It should be stressed, however, that most scientists perceive competencies as a broader and superior term as compared to qualifications, because the latter arise from and are built on the former [Kanungo, Misra 1992; Pocztowski 2003]. It is argued that "... qualifications represent input, potential, while competencies concern its directing and application, or performance and its effects" [Orczyk 2009, p. 28]. Although according to J. Orczyk, this is a sort of narrowing of term, it offers large opportunities to perceive mutual relationship, adaptation to new challenges for organisations, teams and team members. Accomplishment of goals by organisations and employees is determined by competencies in an increasing extent, while knowledge as observance of procedures and standards is defined by qualifications [Orczyk 2009, p. 19-32]. J. Orczyk argues that competencies arise mainly from qualifications, but their scope is different. They determine their application for targeted and efficient operations. This includes also skills and such traits as personality, especially motivation, responsibility for performance of particular standards in accordance to specific norms or contracts. In other words, without qualifications, there are no competencies, but it is competencies which determine possibility to undertake and accomplish responsibly tasks occurring through lifetime, and especially professional life: scope and application of competencies determine results of work [Orczyk 2009].

The term "competency" provides for considering the sphere of motivating for work, its variability, conditions of implementation, including especially the possibilities to increase it or to adapt it to the ever growing standards of performance. Competencies are not just an opportunity to perform work well. They involve trust that the job is done according to rules, considering general conditions and situations. Competencies are nowadays expressed more and more frequently in putting strong stress on independence and responsibility in performing tasks. In other words, competencies are a conscious decision to undertake work and related responsibility for its performance according to standards arranged for with the customer [Orczyk 2009].

R. E. Boyatzis argues that competencies may be also defined as "capability or ability. It is a set of related but different sets of behavior organized

around an underlying construct, which we call the 'intent'. The behaviors are alternate manifestations of the intent, as appropriate in various situations or times" [Boyatzis 2008, p. 8]. This researcher stresses the effect on competencies resulting from the mode of organising of operations, including culture, structures, maturity (concerning criteria and position of the contractor), but also the environment of the organisation: economy, politics, society, religion and natural environment. However, in any case, according to Boyatzis, competencies are determined by a configuration of three variables which affect behaviours. There are three threshold clusters of competencies:

- expertise and experience, which is a threshold level of competency;
- knowledge which may be declarative, procedural, functional or metacognitive and which is a threshold competency;
- an assortment of basic cognitive skills, which permit independent performance of new tasks, which involve memory, perceiving correlations, concluding and which determine not only achievement of competencies, but also their potential development [Boyatzis 2008].

Similar approach to competencies is offered by C. Levy-Leboyer. In his opinion, competencies concern integrated application of capacities, personality traits, as well as acquired knowledge and skills in order to ensure successful achievement of the mission assigned within an enterprise and they are a specific category of individual features which are strictly associated with hierarchies of values and acquired knowledge [Levy-Leboyer 1997, p. 19]. Terminology analysis is even harder because some authors sometimes, as needed, use a narrow or expanded context. For instance, Cz. Nosal argues that "the narrow interpretation of the term competencies has been and still is used referring to things like scope of knowledge, intellectual disposition, different types of skills (...) which are required at different posts or levels of management". Meanwhile, in his opinion, "the broader psychological concept of competencies includes things described as interpersonal skills, i.e. ability to recognise people and their emotions, communication, leading, influencing others etc." [Nosal 2001, p. 4].

The concept of broad definition of competencies and inclusion of personality tendencies as their component is supported by T. Oleksyn. In defining competencies, he lists the following elements: internal motivation, talents and predisposition, knowledge, education, experience and practical skills, health and form, other psychological and physical features which are important in the processes of work, attitudes and behaviours which are expected at the workplace, formal authorisations to operate [Oleksyn 2007, p. 30].

There are especially intensive controversies concerning definitions of management staff's competencies [Schulz 1971; 1980; 1987; McClelland 1973; Boyatzis 1982; 2008a; 2008b; 2011; Eyde, Muldrow, Mergen 1999; Chełpa 2003; Naquin, Holton 2006; Niedzielski, Walkowiak 2004, p. 229-238; Jokinen 2004; Rakowska 2007; Witkowski, Listwan 2008; Antczak 2008; Moczydłowska 2008; Orczyk 2009; Ragg 2011; Gholipur et al. 2012; Overby, Suvanujasiri 2012]. The term "competencies" has appeared in the model of acquisition of managerial skills by M. Argyle [1967] who argued that to perform skilfully their work, managers ought to have some competencies, internal resources and knowledge. One should note that in the 1980s and 1990s competencies were defined as "skills" [Argyle 1967; Bandura 1997; Whetten, Cameron 1984]. The original meaning of the term was rooted in behavioural psychology and the modern "managerial skills" are still influenced by the social psychology of learning [Bandura 1977]. J. P. Kotter [1982] claimed that the previous term of "managerial skills" is equivalent to the modern "managerial competencies" based mainly on behaviourism. The basic method of identification of behavioural competencies is observation, whether, in a group of people who perform the same tasks, people who achieve the best results manifest a specific set of behaviours which allows for such results. In this context, to be competent, a manager should hold a range of features which make it possible to translate the held skills and knowledge into efficient operations [Antonacopoulu, Fitzgerald 1996]. Similarly, although more broadly, competencies are defined by A. Gick and M. Tarczyńska [1999, p. 45], who perceive them as "knowledge, skills, behaviours, features and attitudes specific for those who achieve the highest efficiency".

In the USA, the theory of managerial competencies was enriched markedly by research by R. E. Boyatzis [1982] aimed at determination of characteristic features which extinguish the best managers. In the context of his work, "competency" as the most important feature of a manager is defined very broadly. This may be a motive, feature, skill, aspect of one's self-image or a social role, scope of knowledge applied; "competencies are casually related to effective and/or superior performance in a job" [Boyatzis 1982].

An interesting concept concerning improvement of managers' skills was presented by K. S. Cameron and D. Whetten who wrote about possibilities to improve managers' competencies at particular skills [Whetten, Cameron 1984]. These authors represented a behavioural and universal approach, assuming that there were certain universal competencies, common for all managers. C. J. Constable [1988] argued that managerial competencies were capacity to apply knowledge and skills which contributed to efficient performance of manager's function. Therefore, all managerial skills may be competencies, when applied in the correct way. A. Rakowska and A. Sitko-Lutek [2000] reviewed terminology of this area and they found that competencies are a broader term than skills and that the level of competencies depends on knowledge held, personal talents, qualifications and experience, skills to apply those, attitudes and motivation. According to G. Bartkowiak [2002], managerial competencies include perception of objectives, attitudes and motives of individuals, as well as knowledge of social structures (technological and social environment, organisational culture). They are also understood as the scope of organisational authorisations attributed formally to a specific position [Chełpa 2003, p. 50-51].

The analysis of research results published in the last 30 years permits a conclusion that outstanding managers had threshold competencies (knowledge and experience, basic cognitive competencies) [Boyatzis 2008; Chong 2011] and competencies which differentiated them from average managers. These latter competencies are described by some researchers as over-average level of cognitive, emotional, social competencies and emotional intelligence [Boyatzis 2008]. Other authors associate them with achievement of high performance assessed by observation of behaviour [Chong 2011].

The most controversies and differences of opinions, as shown above, occur at defining components of competencies. The researchers list the following elements, frequently defining them in variable ways:

- knowledge and skills [Boyatzis 1982; Dubois 1993; Louart 1995; Robotham, Jubb 1996; Nosal 1997; Levy-Leboyer 1997; Nogalski, Śniadecki 1998; Lucia, Lepsinger 1999; Gick, Tarczyńska 1999; Pocztowski, Miś 2000; Juchnowicz 2000; Rakowska, Sitko-Lutek 2000; Schippman et al. 2000; Oleksyn 2001; Górska 2001; Becker, Huselid, Ulrich 2002; Chełpa 2003; Whiddett, Hollyforde 2003; Rostkowski 2004; Lendzion, Stankiewicz-Mróz 2005; Król 2006; Oleksyn 2007];
- set of behaviour patterns [Kanungo, Misra 1992; Armstrong 2000;
 Whiddett, Hollyforde 2003; Wood, Rayne 2006; Spendlove 2007];
- psychological/psychophysical features (set of personality and intellectual predispositions of an intellectual, health and form) [Boyatzis 1982; Kanungo, Misra 1992; Nosal 1997; Levy-Leboyer 1997, p. 19; Oleksyn 2001; Ingelgard et al. 2002; Chełpa 2003; Rostkowski 2004; Delamare Le Deist, Winterton 2005; Oleksyn 2007; Moczydłowska 2008];
- motivation, although this component is the most controversial [McClelland 1973; Boyatzis 1982; Mingotaud 1994; Boyatzis, Kolb 1995; Henderson, Anderson 1995; Quinn et al. 1996; Robotham, Jubb 1996; Suchar et al. 1996; Van Clief 1998; Pocztowski 1998; Smoleński 1999; Bartkowiak 2000; Rakowska, Sitko-Lutek 2000; Dąbek 2001; Whiddett, Hollyforde 2003; Fulmer, Conger 2004; Gangani, McLean, Braden 2006; Oleksyn 2007; Nosal 2001];
- values [Bergenhenegouwen, Horn, Mooijman 1997; McLagan 1997; Levy-Leboyer 1997, p. 19; Pickett 1998; Pocztowski 1998; Jędralska 1998; Van Clief 1998; Skrzypczak 1998; Schippman et al. 2000; Torrington, Hall 2000; Juchniewicz, Rostkowski 2004];
- perception of work, of oneself and one's talents [Boyatzis 1982; Sandberg 2000; Fulmer, Conger 2004; Gangani, McLean, Braden 2006];
- attitudes [Thierry, Sauret, Monod 1994; Gick, Tarczyńska 1999;
 Rakowska, Sitko-Lutek 2000; Oleksyn 2001; Bartkowiak 2002;

Filipowicz 2004; Lendzion, Stankiewicz-Mróz 2005; Oleksyn 2007; Król 2006];

- style of actions [Rostkowski 2004];
- formal authorisations to act [Pasieczny 1982; Kopaliński 1989;
 Dunaj 1996; Nogalski, Śniadecki 1998; Skorupka 2002; Chełpa 2003; Oleksyn 2001; 2007; Moczydłowska 2008].

Concluding this review of opinions on defining competencies, one should say that still there is no agreement among researchers in this area, either concerning terminology or components or even definition of these components. Frequently, these controversies result in terminology chaos and eclectic approach. However, considering the objective of this work and trying to find a consensus, upon analysing the opinions published in professional literature, the author resolved to apply in the research, firstly, the term competencies instead of qualifications, because they manifested at performing particular job, in the variable organisational context specific environment (e.g. knowledge-based economy). Secondly, the research was limited to key competencies of management staff, i.e. psychological traits⁹, knowledge and skills¹⁰. Therefore, in this book, key competencies of management staff in the knowledge-based economy are defined as those psychological traits, knowledge and skills which are important or very important in the knowledge-based economy.

Authors who stress not only importance of psychological traits, but also their fundamental mearning in achievement of success by management staff, include: [Dornan, Maxwell 1995; Fukuyama 1997, p. 20; Szałkowski 1997, p. 131; Pasieczny 1998; Chełpa 1996; 2003; Goleman 1999a; 1999b; Błaszczyk 1999; Mayer, Salovey 1997; Dudek, Wichrowski 2001; Robinson 2003; Buckingham, Clifton 2003; Covey 1996; Law, Wong, Song 2004, p. 89; Rakowska 2007; Oleksyn 2006; Davenport 2007; Sajkiewicz 2008; Preston 2008; Boyatzis 2008a; 2008b; 2011; Edersheim 2009; Emmerling, Boyatzis 2012; Boyatzis, Massa, Good 2012; Boyatzis et al. 2012; Kupczyk 2013a].

Research results by the following authors confirm the opinion, widely presented in the professional literature, that knowledge and skills have marked influence on managers' efficiency: [Katz, Kahn 1979; Listwan 1986; Steinmann, Schreyögg 1992; Sandwith 1993; Drucker 1994b; Waitley 1995; Henderson, Anderson 1995; Witkowski 1995; Adamiec, Kożusznik 1996; Nosal, Piskorz 1996; Griffin 1996; Hesselbein, Goldsmith, Beckhard 1997; Borkowska, Bohdziewicz 1998; Nogalski, Śniadecki 1998; Pietrasiński, Frankowicz 2000; Przedsiębiorstwo przyszłości ... 2000; Bratnicki 2000; Rakowska, Sitko-Lutek 2000; Pocztowski 2002; Bartkowiak 2002; Little, Quintas, Ray 2002, p. 319-347; Chełpa 2003; Walkowiak 2004; 2006; Koźmiński 2004; Sitko-Lutek 2005; Penc 2005; Gableta 2006; Morawski 2006; Kupczyk 2002; 2006c; 2013a; Rakowska 2007; Witkowski, Listwan 2008; Wójcik 2009; Costina 2009; Matusiak, Kuciński, Gryzik 2009; Stor 2010].

1.2. Defining and measuring the knowledge-based economy

The knowledge-based economy has been talked about since the 1990s. Initially, the term "new economy" was used, referring to the economy of the United States which focused on new technologies, mainly information and telecommunication technologies and overall development of education in this area [cf. Woroniecki 2001]. It was interpreted as a superior economic structure supplied by innovation in information and communication technologies (ICT) which affected all branches of economy by faster growth of efficiency and faster economic growth [Piątkowski 2002]. Among the first publications which used the term "knowledge-based economy", there were The Knowledge-based Economy: the Nature of the Information Age in the 21st Century 1990, published by the Institute of Information Studies and *The Knowledge-based Economy*, issued by the OECD in 1996. They stressed the significant effect of knowledge application on economic development. In their joint report, the OECD and World Bank defined the knowledge-based economy as an economy where knowledge is developed, learned and applied more effectively by enterprises, organisations, individuals and communities, contributing to fast development of the economy and society [OECD 2000]. Nowadays, more stress is put on the correlation between knowledge and increased competitiveness of economies [Rakowska, Sitko-Lutek 2000; Koźmiński 2001; Balicki 2003] or even regions or countries [Kofela 2010; Puślecki 2007]. A. K. Koźmiński [2001] argues that building of the knowledge-based economy involves creation of conditions which support establishment and success of enterprises which rely on knowledge in their competitive advantage¹¹. Currently, researchers refer even to development of a paradigm of the knowledge-based economy and, as stressed by A. Kukliński, this is mainly due to activities of big international organisations, such as the OECD [cf. Kuliński 2001], World Bank [Kukliński 2003] and European Union [Gaczek 2009; Kukliński 2011]. Despite many years and multiple publications, the term of knowledge-based

Terminology concerning competitive advantage was reviewed by M. J. Stankiewicz [2005, p. 167-168].

economy has not yet gained an unequivocal definition. There is no conformity concerning either terminology or measurement methods. There is a visible terminology chaos, lack of comprehensive approach and methodological inconsistencies. This is especially worrying considering representatives of enterprises who perceive this term rather as a symbol for exactly those reasons and focus on increased intensity of knowledge application in their organisations.

The review of professional literature permits comparison of different approaches to defining this term which brings new focus on the essence of the knowledge-based economy (Tab. 1.1).

Table 1.1. Defining the knowledge-based economy – a review of approaches

Definition of the knowledge-based economy	Author, source
As defined by OECD, this is an economy which relies directly on production, distribution and application of knowledge and information. In this approach, knowledge is defined as a product and as a factor which drives economic growth	
Economic system where knowledge is the crucial resource	Drucker 1999b
Economy where knowledge is the main source of wealth and the most important factor of production	Chojnicki, Czyż 2003, p. 203; Onak-Szczepa- nik; Piech 2009, p. 214
Economy where knowledge is developed, learned, provided and applied more effectively by enterprises, organisations, individuals and communities, contributing to fast development of the economy and society	OECD 2000
Economy where knowledge is main factor of productivity, competitive advantage and economic growth	Rakowska, Sitko-Lutek 2000
Economy with many operating enterprises which rely on knowledge in their competitive advantage	Koźmiński 2001
Knowledge-based economy is defined as an economy which relies directly on production, distribution and application of knowledge and information and where information and communication technologies and other technologies play a role of important tools	Porwit 2001, p. 115.
This is an economy where there are operating mechanisms which lead to application of knowledge in order to increase enterprises' competitiveness	Balicki 2003, p. 123.

In this economy social and economic development is stim- ulated by human knowledge and possibilities to create it, thus forming a sort of feedback between the economy and the society	Kukliński 2003
According to the definition by the European Commission, such economy is commercial retrieval of new technologies, ideas or methods, which are used to introduce new products and processes or to improve previous ones	Simme et al. 2002
Economy characterised by fast development of domains related to information processing and scientific development, mainly in the industries referred to as high-tech, as well as techniques and services typical for the information society	Portal Funduszy Europejskich, www. funduszeeuropejskie. gov.pl/slownik/Strony/ Gospodarka_oparta_na_ wiedzy.aspx
Economy in which companies apply the power of computers and well-trained minds to create prosperity	Brinkley 2006, p. 3
Economy in which the share of labour which applies knowledge intensively is high, the share of information sectors in the economy is a determining factor and the share of intangible assets in the total actual capital is bigger than that of tangible assets	Foray 2004, p. 9
Technologically advanced economy which has significant assets and technologies, it is characterised by high level of human capital, expenses or research and development and competitiveness at international markets	Puślecki 2008
Economy in which not only knowledge, but also innovations are applied intensively	Chodyński 2007; Międła 2008; <i>Podręcznik Oslo</i> 2008; Baczko 2009
Economy in which knowledge is treated a factor which shapes the production structure and economic progress at the stage of advanced social and economic development	Skrzypek 2008
Knowledge-based economy is an economy dominated by products and services of market value dependent to a large extent on knowledge and not on tangible assets. The carriers are: high-tech industry, information society services, knowledge and education services	Skrzypek 2011
This is an economy supplied by innovation, technology and talents	Northern Ireland Knowledge Economy Index 2011, p. 9
An important manifestation of the knowledge-based economy is establishment of a new section of financial accounting, i.e. competencies assets and intellectual capital accounting	Niemczyk 2013

Source: original development.

In the approaches suggested by many authors, two important terms appear, which require definition: human capital and intellectual capital. In this book, human capital is defined as "a set of features held by individuals, such as knowledge, skills, psychological traits, health, behaviour, which have specific value and which may be a source of future income, both for employees and the organisation". It is assumed that "its multiplication in a company involves above all improvement and development of employees, which may be regarded as investments in the human capital. Contrary to tangible capitals, human capital is specific basically for its qualitative and difficult to measure nature: what may be marketed and cannot change its owner, forms configurations which are hard for competitors to copy" [Listwan 2005, p. 57]. Meanwhile, intellectual capital is understood as: "a type of 'hidden' assets of an enterprise which lead to creating value for employees, shareholders and customers (...). It is composed of the human capital, structural capital and customer capital, also known as market capital, concerning the organisation's relations with its environment" [Listwan 2005, p. 56-57].

The analysis of opinions presented in Table 1.1.confirms that no unequivocal and universally accepted definition of the knowledge-based economy has been developed yet. The most frequently used and the least controversial definition seems the one suggested by the international institutions such as OECD and World Bank, which have been involved in measurements of knowledge-based economy for years. The author decided to enrich it with the aspect of knowledge as a factor of competitive advantage, as mentioned by A. K. Koźmiński [2001] and other researchers.

Consequently, in this book, the knowledge-based economy is defined as an economy in which knowledge is created, learned, diffused and used more effectively by enterprises which rely on it in their competitive advantage. This definition contains the term "knowledge" which also requires terminology analysis. Knowledge is a "set of content (information and data) collected and fixed in human mind which is a derivative of experience and learning processes. By processing the collected information in mind, human being enriches it by new items; by learning, human being

reshapes it; and by gaining experience, human being creates knowledge" [Mikołajczyk 2003, p. 25]. Narrowly interpreted, knowledge is also defined as "the whole of reliable information about reality and ability to use it (...). Broadly defined, knowledge is a set of all information, opinions, beliefs etc. which have an attributed cognitive and/or applied value" [Kisielnicki 2008, p. 254]. It is also defined as all information and skills used by an individual to solve problems [Probst, Raub, Romhardt 2002, p. 35] or as "a set of all information, opinions, beliefs etc. which have an attributed cognitive and/or applied value" [Kisielnicki 2008, p. 254]. The economic approach treats it as information which may be processed and used to make rational economic decisions. Another approach makes it an economic good which may be private property and may be marketed as merchandise [Łobesko 2004, p. 33]. In economics, it is argued that previously economists treated knowledge as companies' asset needed to generate profit. Thus, any company operates based on the knowledge it holds – company as a knowledge warehouse [Nonaka, Takeuchi 2000, p. 55]. In this book, knowledge – in relation to the knowledge-based economy – shall be defined as [quoted from: Koźmiński 2001]: "result of intellectual potential, as an intangible asset of companies which is difficult to copy and which consists of all types of useful information which others don't have and can't use".

It is worth noting that it is still controversial that application of knowledge in economy is not specific (only) for modern times. The difference lies only in higher intensity of its application, and mainly in optimisation processes. More stress is put on application of knowledge as the main factor of productivity and competitive advantage at enterprises. Probably, the ambiguity and imprecise demarcation – concerning both definition and measurement of the knowledge-based economy – is the reason why the new strategy of the European Union entitled "Europe 2020" does not stress knowledge-based economy any more, although it mentions intelligent development based on knowledge and innovation. The strategy indicates necessity to increase the role not only of knowledge, but also of innovations, education and development of digital strategy. In its approach to economy, it stresses also its sustainability and increased competitiveness [*Europe 2020*... 2010]. This will force a broader look at the knowledge-based economy, also

from new points of view and it won't solve terminology and measurement issues, rather, they will grow even deeper. Therefore, researchers should still look for solutions to allow operationalization of the knowledge-based economy at the level of enterprises.

Analogically to the knowledge-based economy, knowledge-based organisation has no clear definition, either. A review of the professional literature permits a conclusion that authors do not undertake development of a precise definition, focusing on describing particular features. The author attempted to list opinions concerning identified features of knowledge-based organisations (Tab. 1.2).

Table 1.2. Features of a knowledge-based organisation – a review of approaches

Features of a knowledge-based organisation	Author, source
Knowledge is a crucial asset there, a source of wealth and the most important factor of production	Drucker 1999; Chojnicki, Czyż 2003, p. 203; Onak-Szczepanik 2009; Piech 2009, p. 214; World Bank 2006, p. 2
It manufactures knowledge-rich products (i.e. products in which knowledge constitutes more than 50% of their value) or renders services based on application of knowledge to a larger extent than on physical effort	Grudzewski, Hejduk 2004; 2008, p. 135; Mikuła 2008, p. 33
It supports work based on knowledge, i.e. on creativity and creating value added to information	Gladstone 2004, p. 51; Międła 2008, p. 98
It applies information and communication technologies	Macias 2007, nr 10, p. 19; Huk 2008; Morawski 2008
It applies innovations	Chodyński 2007; Międła 2008; Podręcznik Oslo 2008; Bac- zko 2009; Lundvall 2010
It is able to operate in the conditions of globalisation, very high risk and it takes rapid decisions	Macias 2007, p. 19; Huk 2008
Learning is a key competency of such an organisation	Senge, Kleiner, Roberts, Ross, Smith 2002
It has an ability to analyse and interpret information and then to translate it to operations	Drucker (cyt. za: Edersheim 2009)
It protects confidential knowledge from leaking	Perechuda 2005, p. 33
It invests in intangible assets, intellectual capital	Mikuła 2007, p. 33

It employs high-level specialists, so-called knowledge staff who are the core of its employment	Mikuła 2007, p. 21; Grudzewski, Hejduk 2008
It builds its strategic advantage on unique competencies of its employees	Morawski 2008; Mikuła 2007, p. 21; Skrzypek 2004, p. 75; Perechuda 2005, p. 33
Its market value is determined largely by the value of its intellectual capital, which means that the ratio of market value to book value is higher than 2	Kukliński 2003, p. 179; Onak- Szczepanik 2009
It relies on networks of mutual cooperation based on various relations and on partner enterprises	Mikuła 2007, p. 21
Teamwork is promoted there	Morawski 2008
Its structure is focused and oriented on creation of added value by the way of efficient application of knowledge	, ,
It replaces hierarchies with relations	Morawski 2008

Source: original development.

The list shown in Table 1.2 does not permit a precise response to the question what is a knowledge-based organisation, and – equally importantly – it does not facilitate identification of unequivocal indicators to measure it. Entrepreneurs and employees certainly face dilemmas when asked whether their organisations are knowledge-based and whether they create the knowledge-based economy.

Referring to arguments relied on at defining the knowledge-based economy, the author resolved to apply the following definition of the knowledge-based organisation in this book: these are organisations where knowledge is created, learned, diffused and used more effectively and it is what the organisations rely on in their competitive advantage.

Knowledge-based economy index

There are serious doubts and controversies concerning various approaches to methodology of measuring the knowledge-based economy. The most important institutions which contribute to their development nowadays are the World Bank, OECD, UNECE (United Nations Commission for Europe) and Progressive Policy Institute [Piech 2009]. In 1998, the World Bank created a methodology to assess knowledge (*knowledge assessment*

methodology - KAM). In 2002, UNECE provided its own model of measurement of the knowledge-based economy, relying on the methodology developed by the Centre for International Development at Harvard University. It applies 19 basic categories of indicators of the knowledge-based economy. The objective of the methodology is to measure "readiness" for the knowledge-based economy by creating the Global Knowledge-Based Economy Index (GKEI) which combines expertise of the International Telecommunication Union (and its Global ICT Index) with achievements of the World Economic Forum (Growth Competitiveness Index). According to many authors, description of the knowledge-based economy should be focused on determination of a single measure of the knowledge based economy to allow comparable assessments at the international level. Such an objective was set by the World Bank's Institute. Despite the criticism of excessive simplicity of this model, the institute presented a classification of a range of indicators presented at the scoreboard of its knowledge assessment methodology [KAM 2004; 2006; 2007; 2008; 2009]. Based on the simplified scoreboard, KAM provides two types of global indicators. The first one is thee Knowledge Economy Index (KEI) which is a straight average of the country's results at four pillars of the knowledgebased economy (i.e. economic incentive regime (1), education and human resources development (2), innovativeness (3) and information and communication technologies (4)); the other is the Knowledge Index (KI) [World Bank 2011b]. This is a straight average of the country's results in three pillars of the knowledge-based economy (i.e. education, innovativeness, information and communication technologies). A full description of the methodology is provided by D. H. C. Chen and C. J. Dahlman [2005]. The KAM version of 2006 contains 60 variables for 128 countries. The variables are divided into seven clusters: condition of the economy, economic regime, governance, innovation system, education, gender, ICT. The 2007 version contains 83 variables for 140 countries [KAM 2007]. The latest version is the 2009 one which contains 107 variables for 146 countries [World Bank 2011a].

In order to facilitate the procedure of assessing particular countries and international comparisons concerning knowledge application in economies, the so-called standard assessment form. Fourteen variables were selected [quoted from: Puślecki 2007]:

- overall socio-economic situation is described in this form by average annual GDP growth, HDI human development index,
- economic and institutional regime is characterised by: tariff & nontariff barriers, regulatory quality, rule of law,
- innovation system is reflected in: royalty and license fees payments and royalty and license fees receipts (US\$ millions) per million population, number of scientific articles in selected areas, number of patents granted by the American patent authority,
- education system is characterised by: literacy rate as percentage of the population above 15 years of age, secondary enrolment percentage, tertiary enrolment percentage,
- ICT infrastructure is described by telephones per 1,000 people, computers per 1,000 persons, internet users per 1,000 people.

An entire review of methodologies of description and measurement of the knowledge-based economy was presented by K. Piech [2009] or J. Kleer [2009]. Another issue is worth noting and needs clarification. According to the definition of the knowledge-based economy suggested by A. K. Koźmiński [2001] this is an economy with many operating enterprises which rely on knowledge in their competitive advantage. However, there are opinions that in the knowledge-based economy all enterprises should be knowledge-based organisations. This is wrong. Of course, immediately a question occurs how many enterprises in Poland are knowledge-based and how many in the European Union. Unfortunately, this question remains unanswered so far. This part of empirical research should be regarded as entirely neglected, even by the European Union. Similar problems concern indicators which would allow management staff to monitor knowledge application at their enterprises and to determine whether they are knowledge-based organisations.

1.3. Knowledge-based economy in Poland as compared to economies of the European Union and OECD

To answer the question whether the Polish economy may be considered a knowledge-based economy or not, statistical data and ranking results were analysed. The most reliable data are those contained in results of international comparisons and they show the Polish economy in quite an adverse situation [Powichrowska 2011, p. 22-26]. In the Knowledge Economy Index 2012 ranking developed by the World Bank, Poland ranked 38th among 146 countries (Fig. 1.1).

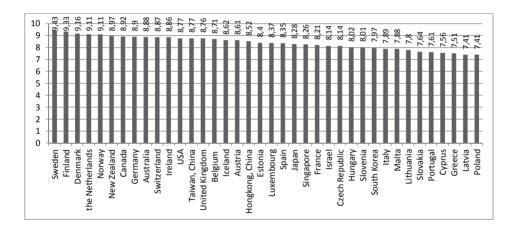


Fig. 1.1. Poland as compared to other countries according to the knowledge economy index KEI 2012

Source: originally developed based on data of the World Bank (online): info.world-bank.org/etools/kam2/kam page5.asp accessed on the 18.12.2012

The highest positions were taken by such countries as Sweden, Finland and Denmark. Poland was also ranked lower than Germany (#8), USA (#12), Czech Republic (#26) or Hungary (#27) ["Knowledge Economy Index 2012; World Bank 2012]¹². As compared to 2000, Poland's position fell by three places, while the Czech Republic, Hungary and Romania improved their results.

¹² KAM 2012 (www.worldbank.org/kam). KAM methodology and value of KEI and KI indices

Not only numerous statistical studies, but also analyses and research by many scientists [Goldberg 2004; Kukliński 2007; Kupczyk, Kubicka 2010a; Browne, Geiger 2010; Hyperconnectivity ... 2010; Matuszewska, Piech 2011; OECD 2011; *Education at a Glance* ... 2012, "Knowledge Economy Index" 2012; Dutta, Bilbao-Osorio 2012; Szczucka, Turek, Worek 2012; Górniak 2013] indicate that the Polish economy cannot be described as (entirely) knowledge-based yet. There are several reasons to this situation. One of the main causes is that the Poles invest too little in knowledge and they participate in education (especially lifelong learning) to a too small degree. In an international comparison by the "knowledge" index, Poland is ranked 37th and by the "education and human capital" index – 24th (Figs. 1.2 and 1.3).

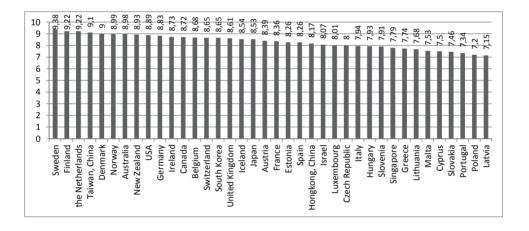


Fig. 1.2. Poland as compared to the best countries in the "knowledge" area (KEI index) according to KAM methodology, World Bank 2012

Source: originally developed based on data of the World Bank (online): info.world-bank.org/etools/kam2/kam_page5.asp accessed on the 18.12.2012.

This is not the worst result, especially concerning growth of the number of people aged 15-64 with university education. This result may be even considered impressive. In 2006 the proportion of such persons in Poland

⁽²⁰¹²⁾ was described at info.worldbank.org/etools/kam2/KAM page5.asp.

was 14.9%, while in 2010 - 19.8% [GUS]. However, this result is still lower than the average rate in 2010 for the countries of the European Union -27% or OECD -30% [Education at a Glance ... 2011].

This distance will probably persist in the coming years, because according to the thirty-year trend by OECD (based on GUS data), in 2025 the ratio of people with university education in the general population shall be:

- aged 25-34: in Poland 31%, in OECD 41%;
- aged 35-44: in Poland 29%, in OECD 41%;
- aged 45-54: in Poland 24%, in OECD 34%;
- aged 55-64: in Poland 15%, in OECD 28% [Analiza trendów ...
 2009].

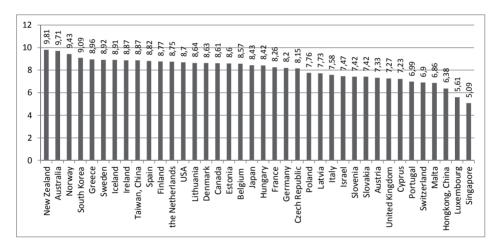


Fig. 1.3. Poland as compared to the best countries in the "education and human capital" area (KEI index) according to KAM methodology, World Bank 2012

Source: originally developed based on data of the World Bank (online): info.world-bank.org/etools/kam2/kam_page5.asp accessed on the 13.01.2011.

Poland fares worse as far as participation in lifelong learning is concerned. It is much lower than in the developed countries of the European Union: it was 4.7% in 2009 and 5.3% in 2010. There is a visible progress, although the planned target for 2010 was 7% [*Raport Polska 2011...* 2011, p. 64]. Until 2015 it is planned to achieve participation in lifelong learning at the level of 10%, although, considering the current slow progress in this

area, decreasing resources from the European Union and state budget for training and postgraduate studies as well as barriers encountered by persons who want to develop themselves [Kupczyk 2006a; 2010b; Kupczyk, Cierniak-Emerych 2011], its achievement is improbable. Also, the latest (third) edition of the "Balance of the Human Capital" study report indicates that throughout 2011 and beginning of 2012, a total of 36% of Poles aged 18-59/64 (almost 9 million people) participated in any form of improvement of their competencies. Twenty percent (4.8 million) of Poles participated in any courses, training, workshops, lectures, seminars, conferences, internships or postgraduate studies. Five percent (1.2 million) participated exclusively in the compulsory health and safety or fire protection trainings, while 15% (3.6 million) developed their competencies at non-compulsory courses or training [Szczucka, Turek, Worek 2012]. Unfortunately, some entrepreneurs are not convinced that permanent development is necessary, including development of managerial competencies. The 2007 study held by Obserwatorium Zarządzania Foundation showed clearly that only 11% of company owners in Poland were positively convinced about necessity to develop skills and knowledge concerning company management and business and further 21% were rather convinced. Almost two thirds of them perceived no need for training [Boni 2009].

The knowledge-based economy requires innovativeness. In international comparisons, innovativeness of the Polish economy does not look good. In the European Union, leaders of this area include Denmark, Finland, Germany and Sweden, and worldwide: USA and Japan. According to the European Innovation Scoreboard (EIS)¹³ for 2010, published by the European Commission, Poland was rated 22nd among the 27 countries of the European Union (Fig. 1.4a). Along with the Czech Republic, Greece, Hungary, Italy, Malta, Portugal, Slovakia and Spain it was classified as moderate innovators, but it was below the European Union's aver-

¹³ Innovation Union Scoreboard – analysis performed based on 25 indicators related to scientific research and innovation, classified in three main categories: (i) *opportunity factors*, i.e. human capital, financial resources and scientific research system; (ii) *company factors*, i.e. degree of innovativeness of European companies measured by their investment, intensity of business relations, entrepreneurship and intellectual assets; and (iii) *output factors* which reflect translation of innovativeness to economic profit.

age. Poland's relative strengths included the human capital, while Poland achieved worryingly low result concerning quantity of innovative enterprises, science-business cooperation and commercialisation of research and development effects. Undoubtedly, this situation results from the low level of research and development spending in Poland. Although the rate grew from 0.57% in 2007 to 0.67% in 2009, it is still only 1/3 of the average rate for 27 member states of the European Union (1.77% in 2007) and 2.0% in 2009) [Polska 2011 Raport ... 2011, p. 16]. Meanwhile, in developed countries R&D expenses exceed 3% (in Switzerland or Japan) or even approach 4% (in Scandinavia). Meanwhile, in its development strategy for 2007-2013 Poland defined an objective to increase these expenses to 1.5% of the GDP and to 2.0 in 2015 [Weresa 2009, p. 211]. Considering 2010 results, the plan was not achieved. Up to 2020, Poland intends to allocate 1.7% of GDP to R&D, while the European Union has an average of 3% [Strategia Europa 2020 ... 2010]. Another alarming conclusion of the report [Innovation Union ... 2012]¹⁴ involves stagnation of the level of enterprises' R&D expenses. In the report, experts stress that in longer term, the technology gap between Poland and leading countries will result in reduced competitiveness of the Polish economy. Also the previous year of 2013 brought virtually no improvement. According to the latest report of the Innovation Union Scoreboard (IUS) published in 2013, Poland has improved from the catching up countries group to moderate innovators, however it was classified as last but one in this group, behind the Czech Republic, Portugal, Norway, Spain, Greece, Italy, Malta, Slovenia and Hungary (before Lithuania). Comparison of the achieved innovativeness results as compared to the EIS 2009 report, IUS 2010 report indicated the following changes of indicators for Poland:

 decrease in "SMEs introducing marketing or organisational innovations as % of SMEs" from 29.1 to 18.65;

¹⁴ Innovation Union Scoreboard relies on 25 indicators which the authors found more relevant (as compared to the previous European Innovation Scoreboard publication based on 29 indicators) to reflect the condition of national research and innovation systems. IUS is a tool for monitoring of implementation of the Union of Innovation – a flagship project of Europe 2020 Strategy.

- decrease in "Business R&D expenditures as % of GDP" from 0.19 to 0.18:
- decrease in "SMEs innovating in-house as % of all SMEs" from 17.2 to 13.76;
- decrease in "Innovative SMEs co-operating with others as % of all SMEs" from 9.3 to 6.4 [Polska 2011 Raport ... 2011, p. 234].

Poland is characterised by a lower level of summary innovation index (SII) as compared to the average rate for the European Union, but the growth rate of this index is higher in Poland than in the European Union, which sounds somewhat optimistic. What seems especially alarming in Poland is the low innovativeness of services. Only 9% of all investment expenses in the service sector are spent on research and development as compared to 10% in industry. Comfortingly, the amount of these investments grew in 2009 up to about 690 million PLN [Nauka i technika ... (2009) 2011]. The gap between Poland and the European Union concerning the knowledge-based economy is visible also in analyses of data about "high-knowledge sectors". For instance, the share (%) of employment in these sectors in the general employment in industry and services in Poland is 8.87, while in the EU it is 13.03 [Innovation Union ... 2011]. Other indicators are similarly detrimental. The share (%) of export of products of knowledge services sectors in overall export is 30.60 in Poland and 49.43 in the EU; share (%) of foreign fees on licences and patents in GDP is 0.02 in Poland and 0.21 in the EU [Raport Polska 2011 ... 2011, p. 64]. An especially negative situation is observed in the area of knowledge creation and intellectual property where Poland is below average for all indicators. The number of Polish patent applications has been permanently low for over a decade. Although between 2000 and 2006 the share of foreign entities in R&D funding grew almost four times up to 7% of total R&D funding in enterprises, it still not an impressive number as compared to other European countries, such as Great Britain, Austria or Greece, all of which have the share of foreign sources of funding research and development above 20% [Baczko 2009, p. 12-13]. Still, with respect to patent applications and registered patents, Polish companies are far below not only other European states, but also below the dynamically developing economies of South Korea, Brazil and China.

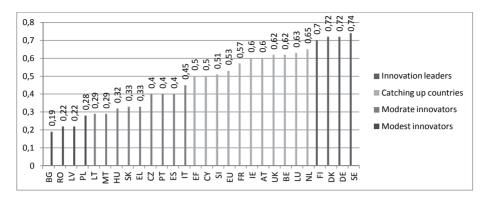


Fig. 1.4a. Results of member states of the European Union in the area of innovation Source: Innovation Union Scoreboard 2013.

Considering the objectives of this book, it is interesting to analyse innovativeness as a factor which affects implementation of the knowledge-based economy. Poland's position by KAM methodology "innovativeness" variable is shown in Figure 1.4b.

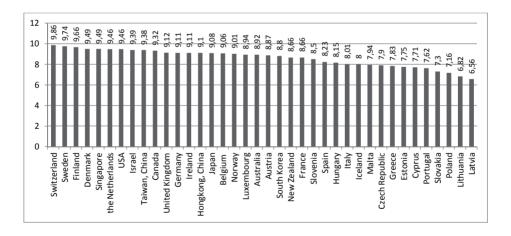


Fig. 1.4b. Poland as compared to the best countries in the "innovation" area according to KAM methodology, World Bank 2012

Source: originally developed based on data of the World Bank (online): info.world-bank.org/etools/kam2/kam_page5.asp accessed on the 18.12.2012.

In this ranking, Poland is ranked only 36th. As innovativeness is a key factor of development of the knowledge-based economy and increase of enterprises' competitiveness, it is necessary to undertake radical action and provide significant financial resources for improvement of Poland's situation in this area.

Somewhat better results, even though not very good ones, are achieved by Poland in application of modern ICT technologies. According to the Global Information Technology Report 2012 ranking which reflects networking advancement of economies, including application of information technologies and innovations [The Networked Readiness Index 2012], Poland is ranked 49th among 142 countries with the score of 4.16 [Dutta, Bilbao-Osorio 2012]. At "business and environment for innovations" Poland's score is 4.2, while at application of ICT in business – only 3.6, rating Poland as 58th among 142 countries. Absorption of technologies by companies is not good (score of 4.3), classifying Poland only at 100th position among 142 countries. The innovation score is only 3.3. The result for training of personnel is a little better (score of 4.1; 55th position); in the area of ICT skills, Poland is 41st among 142 countries with its score of 5.4 [The Global Information Technology Report 2012].

According to the data by the Chief Statistical Office, in 2012 in Poland, 95% of companies used computers, 78% provided their employees with distance access to e-mail, documents or applications online and only 13.5% used ERP software (Enterprise Resource Planning) to share information between different functions of the enterprise (e.g. accounting, marketing, production). Enterprises which offer sale by website or EDI messages (Electronic Data Interchange) amount to 10.9% of all enterprises and CRM software (Customer Relationship Management) is applied to manage customer information by 16.7% of enterprises (GUS). This data may seem optimistic, however, as evidenced by many analyses and comparisons, application of modern ICT in Poland is still insufficient.

Based on Eurostat data, one may conclude that only 17% of enterprises in Poland apply electronic exchange of information concerning management of supply chain (Fig. 1.5a). The European average is 28% of enter-

prises, while in the leading countries (Norway, Austria), the rate is as high as 50% [Giannakouris, Smihily 2010]¹⁵.

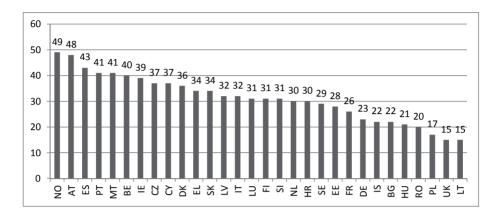


Fig. 1.5a. Number of enterprises which apply electronic exchange of information concerning supply chain management, January 2010 (% of all enterprises)

Source: Eurostat (electronic database: ISO_bde15dip).

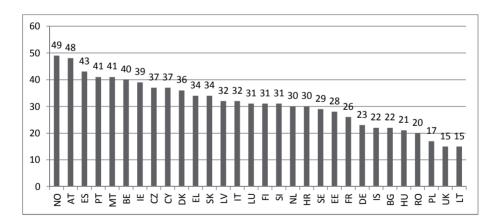


Fig. 1.5b. Enterprises' turnover due to e-economy (% of total turnover achieved) Source: [Giannakouris, Smihily 2010], Eurostat (electronic database: ISO_ec_evaln2).

Statistical study by Eurostat covered 150,000 enterprises in 27 member states of the EU in 2010, (epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive databases).

Almost one fourth of enterprises' turnover in Ireland was due to e-economy operations. As shown by Figure 1.5b, the average for the European Union is 14% and Polish enterprises with their 8% are ranked 22nd [Giannakouris, Smihily 2010].

There are many reasons of such situation discussed, e.g. lack of legal regulations concerning ICT and insufficient involvement of central public administration in development of information and communication technologies, evidenced by the index of actual application of ICT by the public administration (3.4; 99th position). These pessimistic results permit a supposition that under-investment in the ICT sector and its weak application may consequently result in further deepening of the gap in development between Poland and technologically advanced countries [Dutta, Bilbao-Osorio 2012].

According to KAM methodology which describes the level of implementation of the knowledge-based economy model, Poland is rated 37th in the "information and communication technologies" with the score of 6.7 (Fig. 1.6).

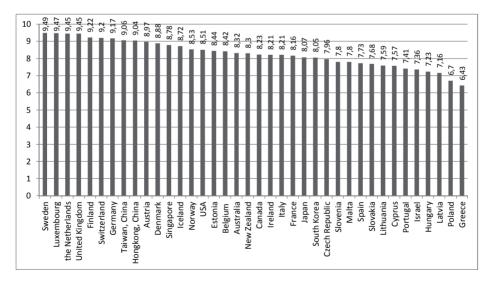


Fig. 1.6. Ranking of countries in the "information and communication" area according to KAM methodology, KEI index 2012 World Bank

Source: originally developed based on data of the World Bank (online): info.world-bank.org/etools/kam2/kam_page5.asp accessed on the 13.01.2011.

Low level of application of ICT in economy is a barrier of its development, limiting collection, processing and – what's the most important – fast and practical application of information and knowledge.

As evidenced by the presented statistics, the Polish economy is not an entirely knowledge-based economy yet, although the selected direction of changes is right. However, a faster rate and broader scope of actions would be recommended to reduce the gap between Poland and the average level of the European Union or OECD. Meanwhile, the presented data permit an assumption that some of the Polish enterprises may be regarded as knowledge-based organisations.

1.4. Correlations between management competencies and corporate results

Assessment of correlations between management competencies and corporate results requires further terminology discussion. The term of competency has been defined in previous sections, so it is necessary to define understanding of corporate results. Initially, the author intended to assess correlations between management competencies and corporate success in the knowledge-based economy. However, this term has very variable definitions and the considered assessment criteria cannot be compared, and – what's more – their methodology is not clearly established. Corporate success is usually defined in the terms of achievement of its objectives, implementation of strategies and tasks [Kaleta 2009, p. 43; Majewska-Opiełka 2007] or successful completion of an undertaking [Penc 1996, p. 58]. The author believes that a corporate success involves not only achievement of goals defined by the enterprise's shareholders, but also by other stakeholders, such as employees, customers, local communities, different institutions, natural environment etc. In the concept of sustainable development, including corporate social responsibility, stakeholders are defined very broadly and they set multiple and variable goals for the enterprise [Freeman, Moutchnik 2013]. This fact influences multidimensional nature

of the term success and large number of criteria of its assessment. While according to some stakeholders the enterprise is successful, others may have an entirely different opinion. Besides, the enterprise may be successful in some areas, having failed according to other criteria. For employee, for instance, payment of a bonus for positive financial results is a success for employees, while management staff usually measures success by financial results, product quality, market share, customer satisfaction, innovativeness, production efficiency, production costs, corporate image etc. [Filipczuk 2002]. A measure of corporate success may also involve achievement of a good position in the sector or even competitive advantage, and thus – achievement of a relatively large market share ensuring secure revenues to permit further development [Filipczuk 2002]. According to other authors, corporate success is evidenced by: duration of market operations, dynamics of revenues, sales profitability and market position [Grabowska, Drygas 2010, p. 517]. Others define it in a much broader manner – by good financial results, profitability, size, market share and position, value, management efficiency, customer appreciation and general image [Cieśliński, Kowalewski 2009]. Success may be perceived also through survival and development [Strużyna, Majowska, Ingram 2009, p. 92; Cieśliński, Kowalewski 2009, p. 25], employees' knowledge [Parzych 2009, p. 846], their competencies [De la Fuente, Ciccione 2002; Michelacci 2003; Bailom, Matzler, Tschemernja 2009; Kupczyk 2009c; 2009d; 2013a; Kupczyk, Kubicka 2010b], intellectual capital or creation of relevant working conditions and motivation [Mazurkiewicz 2010, p. 367; Cieśliński, Kowalewski 2009]. Success may be measured by rapid operations, flexibility, operation integration [Ashkenas 1998; Cieśliński, Kowalewski 2009] or else by innovation capability [Kay 1996, p. 8; Ashkenas 1998; Bailom, Matzler, Tschemernja 2009; Szarucki 2011]. Whether a company is successful or not, may be determined by its inclusion (by independent bodies according to objective criteria at a particular time) in rankings of the best economic entities [Kupczyk 2013a]. In different rankings the criteria are not entirely uniform, which makes it ultimately harder to determine objective measures of success.

Analysis of the opinions presented in the professional literature permits a conclusion that there is no precise definition of corporate success and there-

fore the author finally resolved to study correlations between management competencies and corporate results which are more precise and have an assessment methodology defined by legal provisions. In this book, corporate results shall be defined as financial results presented by companies in financial statements¹⁶, according to chapter 5 of the Act on Accounting (Journal of Laws of 1994, no. 21, item 591, later amended) and art. 3 section 1 points 12, 20, 30, 31, which introduce definitions of the basic economic categories to be included in financial statements. They concern the achieved revenues, dynamics of sales revenues (%) in the year in question as compared to the year before, net financial result (for capital groups: sum of net results attributed to shareholders of the dominant entity and net results of minority shareholders), assets and capital (at the end of the year), export, investments (purchase of intangible and legal assets or tangible assets), employment (average employment in the year in question) and indicators to describe efficiency, such as: return on equity, net profitability, EBIDTA margin¹⁷, dynamics of revenues per one person employed, return on equity and assets, stability and development potential, i.e. revenue growth, intensity of investments and export share in sales, as well as level of expenses on investments.

The author realises that this approach has its limitations and its flaws, especially in the longer term and in the context of dynamically changing environment of enterprises. However, it has a clear advantage over the imprecise and variedly interpreted corporate success.

This section identifies specialist opinions on existence of correlations between management staff's competences and corporate results. The author attempts also to identify such correlations in the knowledge-based economy. It turned out that there are hardly any studies and conclusions in this area, especially concerning the Polish knowledge-based economy. It is so, because this economy is still not entirely knowledge-based and only some

¹⁶ Financial statements present enterprises' financial results according to the rules of accounting. Currently, they are the main source of information about the financial condition of enterprises and they make it possible to set financial information in order and analyse swiftly data concerning the business entity in question. They meet certain quality norms and they are reliable (diligent), understandable for readers, complete, comparable, verifiable, prompt and continuous.

¹⁷ EBIDTA: an indicator in accounting which reflects earnings before interest, taxes, depreciation and amortisation.

enterprises may be considered knowledge-based organisations. According to the authors of the Global Competitiveness Report 2012-2013, Poland is currently at an intermediate stage of transformation from the economy driven by efficiency growth to an economy where innovations become the main factor of development [Schwab 2013]. The difficulty lies undoubtedly in defining and selecting knowledge-based enterprises. Another problem in this case involves the management staff themselves. They are unwilling to participate in studies where their competencies are analysed and where potentially their incompetence may be shown. The issue is even harder due to the difficulty, referred to by Chełpa [2003, p. 64] and other authors, concerning measurement of management competencies, especially those elements which are hidden, not liable to direct observation. It should be stressed that there is quite a large literature presenting concepts of a learning organisation [Senge et al. 1998; Levinthal, March 1993; Mikuła, Ziębicki 2001; Jabłoński 2009; Sitko-Lutek, Skrzypek 2009], knowledge management [Nonaka, Takeuchi 2000; Koźmiński 2004; Perechuda 2005; Morawski 2006b], competencies of modern managers [Pocztowski 1998; Borkowska 2006; Oleksyn 2006; Draganidis, Mentzas 2006; Rakowska 2007; Sajkiewicz 2008] or knowledge-based economy [Porwit 2001; Brinkley 2006; Welfe 2007; Mikuła, Pietruszka-Ortyl, Potocki 2007; Stabryła 2009; Listwan, Witkowski 2010; Hopej, Moszkowicz, Skalik 2010; Dolińska 2010; Kupczyk 2010a; 2013b; Nowakowska, Przygodzki, Sokołowicz 2011]. However, there is a visible gap in theories and methodology concerning identification of key competencies of management staff in the knowledgebased economy and their correlations with corporate results. There are no studies at all about this subject considering the criterion of sex. It is worth noting that correlations of management staff's competencies with corporate success, although mentioned for years, are still very controversial. The most studies concerned existence of correlations between managers' competencies and professional success [Tate 1995; Sveiby 1997; Carroll, McCrackin 1997; Woddall, Winstanley 1998; Lucia, Lepsinger 1999; Winterton, Winterton 1999; Birdir, Pearson 2000; Edvinsson, Malone 2001; Dudek, Wichrowski 2001; Bontis 2002; Sanghi 2007; Horng et al. 2011; Königová, Ubrancová, Fejfar 2012]. There were fewer studies indicating the effect of

managers' competencies on corporate results, competitiveness and success [Hamel, Prahalad 1996; Sveiby 1997; Katz 1999; Prahalad, Hamel 1990; Bratnicki 2000, p. 14; Edvinsson, Malone 2001; Makowski 2001, p. 41; Bontis 2002; De la Fuente, Ciccione 2002; Michelacci 2003; Axelrod, Handfield-Jones, Michaels 2005, p. 105; Kupczyk 2007a; 2009d; 2009e; 2013a; Bailom, Matzler, Tschemernja 2009; Zając 2010, p. 862; Kupczyk, Kubicka 2010b; Mazurkiewicz, Frączek 2011]. Authors are rather unanimous in this opinion, although there are researchers who claim that there is no significant evidence to confirm that management staff's competencies determine corporate success [Ranft et al. 2006]. A large part of researchers confirm strong correlation between lack of managerial competencies and bad corporate results. As shown by studies held between 1998 and 2007, a source of corporate crisis in 52% lay with the management staff (presidents, directors and managers of different levels) [Jadczak 2009].

One should also note models which describe correlations between competencies of management staff (psychological traits, knowledge and skills) and strategic choices by the organisation [Hodgkinson, Sparrow 2002; Bolesta-Kukułka 2003]. A lot of interest, but also controversies have been risen by the "upper echelons" model by D. C. Hambrick and P. Mason [1984]. The authors assumed that it was practically very difficult to study personal characteristic of general managers, including above all their cognitive styles and values which set their mental strategies. Therefore, they suggested an approach based on replacement of direct methods of measurement of manager's features by selected external indirect features (e.g. age, experience, education), i.e. social and demographic features. Their correlations with strategic choices and consequently with corporate results, are affected by a mediating variable, i.e. so-called objective situation (factors inside and outside the organisation) [cf. Rakowska 2007, p. 96-97].

Correlations between competencies of management staff and corporate results in the knowledge-based economy were analysed. Studies confirm that there are such correlations [cf. Katz 1999; Michelacci 2003; Jackson, Hitt, DeNisi 2003; Florczak 2009; Kupczyk 2009c]. However, it must be mentioned that there are very few such studies and besides, there is no methodological cohesion among them. Authors have limited their research to correlations of

corporate results with particular groups of competencies or even with individual competencies.

These groups of competencies will be presented in Chapter 2, divided into psychological traits, knowledge and skills. It should be stressed there are doubts in those papers concerning methods of classification of enterprises as knowledge-based organisations. Majority of opinions refer to postulated management competencies concerning modern environment of enterprises and therefore very frequently the market economy still¹⁸. This issue has already been discussed in previous chapters concerning definition of the knowledge-based economy and its implementation in Poland in the international context. Despite this terminology limitations, it seems justified to review opinions and studies concerning desired competencies of modern management staff, including competencies important for operations in the knowledge-based economy.

1.5. Misadaptation of competencies of Polish management staff to the knowledge-based economy

This section shall discuss opinions of authors and study results concerning misadaptation of competencies of Polish management staff to management in the modern conditions, especially in an environment of the knowledge-based economy. A review of professional literature permits a conclusion that there have been very few studies to identify competencies gap of management staff concerning management in the knowledge-based economy. However, there are very many studies concerning this phenomenon in the current economy [Niedobór talentów ... 2008; Rakowska 2007; Łoboda, Sitko-Lutek 2007; Kupczyk 2010b; 2011; Górniak 2012]. Regular reports by ManPower Group confirm that competencies deficiency of management staff is not at all

Market economy is a type of economy where economic entities operate without state intervention. Economic entities which set objectives and methods to achieve them have the central role in shaping this economy. Market economy means that the mechanism of free market prices changes depending on the current demand and supply [Nasiłowski 1996, p. 21]. Its main principle is free competition [Maczyńska, Pysz 2003, p. 65]. This is an economic system where operations of individual entities are synchronised at the market [Rekowski 2009, p. 36].

a temporary issue [Barometr ManPower 2012]. This fact is confirmed also by other studies [Longenecker, Neubert, Fink 2007; Rakowska 2007, p. 200; 2011; Kupczyk, Cierniak-Emerych 2011]. Importantly, management staff is aware of this deficiency. To verify how Polish managers perceived themselves as compared to managers of other countries, Deininger Consulting held a research covering such features as independence, creativity, planning and strategic action skills, relations with subordinates and efficient application of one's own time. Fewer than a half of respondents assessed their knowledge as rather high and 35% – as medium. Results of this study showed also how Polish managers assessed their own skills in building interpersonal relations, planning and strategic actions. Their assessments indicated that there was still a lot to be done in this area, because as many as 56% of respondents assessed themselves at the medium level and 45% declared that in this areas they were weaker than managers in other countries [Użycki 2009, p. 18]. According to J. Penc [2003, p. 242] their professional and moral qualifications are absolutely misadapted to the roles they wanted and tried to play nowadays. This opinion seems too harsh to agree with. There are still not enough relevant candidates for management positions, especially top management positions (8th place among top 10 of professions with especially marked talent deficiency) [Barometr ManPower 2012]. The competency misadaptation seems the most significant in this area. For instance, the study held in 2012 among entrepreneurs revealed that 100% of candidates for directors and boards of enterprises somehow failed to fulfil competency requirements [Górniak 2012]. The deficiencies have become especially visible at the time of the global crisis, as compared by management staff themselves. Studies held within Talent Club programme showed that only just above a half of the respondent managers (53%) believed that they were sufficiently well prepared to perform their tasks during an economic crisis (16% were not prepared at all) [Polski menedżer ... 2009]. Results of other studies prove that even 68% of respondent managers found that they were not sufficiently strong and stress-resistant to manage companies in such a difficult time. Managers often apply the "run & hide" strategy, by putting blame for troubles on the environment (as mentioned before, in 1998-2007 in the case of 52% of crises at enterprises their

source lay with managers themselves). Only 7% of managers declared that they had high level of strength and psychological resistance [Jadczak 2009].

Deficiencies of management staff concerning competencies which are crucial in the knowledge-based economy are shown clearly above all by the identified gap between the Polish economy and many countries of the European Union and OECD related to application of knowledge (described in section 1.3). However, it must be stressed that in the last 4 years the rate of reduction of the development gap between Poland and the west was faster than ever [Zadura-Lichota 2013]. Misadaptation to management in the knowledge-based economy was confirmed by research in Lower Silesia [Kupczyk 2011]. The study showed that there was a competencies gap concerning skills of application of knowledge, innovation, information and communication technologies, human capital and development of human capital for building the enterprise's competitive advantage. Those four areas are crucial for the knowledge-based economy and they were the main field of interest in the study described in this book. They require greater focus on people in organisation and their development [Toffler 2003; Fleury, Fleury 2005, p. 1647; Leśniak-Moczuk 2005; Pangsy-Kania 2007; Kupczyk 2007a; 2011].

Analysis of those research results and statistical data reveals that to some extent management staff has not coped with that task. A competencies gap was diagnosed, mainly concerning interpersonal skills, communication with employees, ensuring satisfaction of their interests, training and development [Kupczyk 2006b]. The knowledge held and scope of its application at Polish enterprises, especially SMEs is too small, and so is participation in lifelong learning and organisation learning processes [Kupczyk 2008a; PARP 2007; 2009; CEDEFOP 2010; OECD 2010; Kubisz 2010b; Dalziel 2010]. The case is similar for the processes of transfer of knowledge from the science sector to industry which is by far insufficient [Kanter 2001; *Regionalne systemy innowacji* ... 2013]. Nationwide studies by PARP show that 35% of enterprises participated in no training and only 3% took part in training in management [PARP 2007]. Data for Silesia were similar: 30% participated in no training, 6.7% participated in training in management [Kubisz 2010b]. In Lower Silesia the participation was even

lower (43% of respondents participated in no training, among them there were more persons of management staff than employees with no management position) [Kupczyk, Cierniak-Emerych 2011].

According to A. Rakowska processes of organisational learning are not yet a strategic element of building the competitive advantage. Managers declare that they appreciate commitment and competencies of their employees, but they do little to develop the human capital. They are aware that future belongs to learning organisations, but they are not determined enough to create such organisations. More features typical for such organisations can be observed at enterprises of international extent [Rakowska 2007, p. 156]. The studies reveal also that managers themselves pay too little attention to skills related to innovative functioning of the enterprise, such as information technologies, introduction of changes and, consequently, taking risks. Still, managers do not perceive change management which is an important component of managerial competencies as a crucial skill of a perfect manager and they are not willing to undertake implementation of transformation processes [Rakowska 2007, p. 196-198]. Also, their sensitivity to organisations' environment and ability to react to resulting changes of the situation are still too low [Kupczyk, Kubicka 2010b].

Serious deficiency of competencies of management staff in the knowledge-based economy have been identified in the area of talent management [Kupczyk 2010c]. Observations by D. Collings and K. Mallahi [2009] show that talent management is just beginning to evolve and that the actual operations in this domain are highly unsatisfactory. Many managers at organisations still treat talent management as a short-term action, rather a matter of tactics than integral part of the business strategy. Although the situation is improving, but the rate of this improvement is too slow [Guthridge, Komm, Lawson 2008; Tarique, Schuler 2008; 6th European HR Barometer ... 2011].

Education and training system for management staff has frequntly been criticised [Reynolds, Vince 2004; Ghoshal 2005, p. 75-91], Kupczyk 2006b; Kupczyk, Cierniak-Emerych 2011]. It should improve managers' specialist knowledge, competencies concerning operations at the internal market, as well as held them take decisions with satisfactory knowledge about for-

eign markets. Weaknesses of the training system lie in focus on providing knowledge through lectures, too little time devoted to management-related practical classes, excessive content of particular subjects and low flexibility of curricula [Pierścieniak, Szara 2010, p. 96]. P. Motyl, too, criticised management staff and its education. Many companies have implemented management staff development schemes, but most of them concerned individual components of human resources management, e.g. coaching, motivating etc., without touching on crucial issues, such as decision-making in uncertain environment and correct decision-making, ability to model organisational culture or inspire desired behaviour of employees in a long term. Also, too many enterprises neglected aspects of shaping leadership features, as such development schemes are complex undertakings and it is difficult to measure their results in short term. Meanwhile, results of traditional management training which provides knowledge of such areas as labour law, finance, negotiations etc. can be measured practically on the day after at work. This is why it is much easier to justify enterprises' training investments in areas where return on investment can be easily and quickly estimated [Motyl 2011, p. 151].

As stressed by T. Oleksyn [2006, p. 283], quality of education has become very important, as has more comprehensive association of theories and practice and development of such features as intellectual interests, activity, creativity, entrepreneurship and innovativeness. According to E. Chmielecka [2010] who describes three objectives of managerial education (firstly provision of theoretical knowledge; secondly teaching professional skills and thirdly, shaping attitudes), teaching knowledge and skills isn't carried out perfectly. In her opinion, this is due to lack of relevant curricula, equipment and lack of well-prepared teaching staff, too. Scientists, authorities and the European Union stress that the Polish management staff's participation in lifelong learning is too small. Many management positions are held by people who completed their education over a decade ago and who remain passive with respect to any needs of further training. This situation results in formation of competencies gaps, especially concerning knowledge-based economy [Kupczyk 2011; Kwarcińska 2005]. This problem involves mainly small and medium enterprises. OECD data shows that participation in train-

ing is 50% lower at SMEs than at big enterprises in all member states of OECD [OECD 2010]. In all countries small enterprises have the lowest rates of participation in education and professional training, but the rates differ significantly from one country to another. For instance, the lowest rate of participation in education and professional training was noted in Greece (only 16% of small companies included in CVET study). Other countries with low rate of lifelong learning and professional training at small companies are Bulgaria (24%), Poland (27%) and Italy (29%). At the other end of the continuum, the highest share of small enterprises in lifelong learning and professional training was observed in Great Britain (89%), Norway (86%), Denmark (83%), Finland (73%) and Sweden (74%) [OECD 2010]. Entrepreneurs in Poland lack the conviction that constant development, including development of managerial competencies, is necessary. The 2007 study held by Obserwatorium Zarządzania Foundation showed clearly that only 11% of company owners in Poland were positively convinced about necessity to develop skills and knowledge concerning company management and business and further 21% were rather convinced. Almost two thirds of them perceived no need for training [Boni 2009]. When asked why no training was held, representatives of companies replied most often that they perceived no need to hold it. A large part of companies simply don't find investing in development of employees' skills necessary. This data proves that management staff pays too little attention to their own development and to development of their staff, too.

A significantly larger gap in competencies of management staff was diagnosed in the area of innovation. This was confirmed by studies, evaluation reports and documents concerning implementation of regional innovation strategies [Kanter 2001; Rakowska 2007; Kupczyk 2006b; Gwarda-Gruszczyńska, Czapla 2010; Klepka, Gralak 2009; Rogacki 2009; Sztando 2010; *Regionalne systemy innowacji* ... 2013, p. 111]. Management staff's deficient competencies concerning commercialisation of innovations are also stressed [Matusiak, Guliński 2010].

The level of skills concerning information and communication technologies is insufficient, too. The Polish economy remains quite far from highly developed countries and the shares of small and medium enterprises par-

ticipating in ICT training was only 3% [PARP 2007]¹⁹, and in the case of medium enterprises – 8.8%²⁰. Insufficient competencies of application of information and communication technologies in management of enterprises was indicated by even 47% of respondent management staff [Kupczyk 2007a; 2008c; Kupczyk, Cierniak-Emerych 2011]. Many authors finds these deficiencies especially important for future needs, considering the permanent technological, social, economic and organisational developments in industrial sector [Hufstad, Munkvold 2005, p. 80]. This gap shall be a great barrier of development of the Polish economy. Alarmingly, a significant group of management staff does not perceive the crucial effect of development of ICT on enterprises [Kupczyk, Kubicka 2010b; Matusiak, Kuciński, Gryzik 2009].

According to B. Kwarcińska [2005, p. 108] this deficient competencies, especially concerning management in the knowledge-based economy, result also from personality traits of managers themselves, e.g. distrust, strong anxiety resulting in aggressive behaviour, too low or too high self-assessment, as well as negative experiences related to learning or previous work. Another cause may lie in management staff's constantly disrespectful attitude to knowledge of management [Penc 2000, p. 340].

Concluding this chapter, one may argue that there is a certain competencies gap in a part of management staff and that it concerns areas of application of knowledge at enterprises, innovation, information and communication technologies, human capital and its development. This may suggest that this staff is not very well prepared, it proves also some weakness of the education system (including lifelong learning system) for management staff, showing that the system does not entirely meet requirements set by the economy. It is necessary to improve monitoring and forecasting of changes in demand for management competencies, as well as to diffuse this data and implement it in management curricula. There is a clear need to ensure better long-term adaptation of the competencies to development needs of the Polish economy and to demand and supply at the labour mar-

¹⁹ National study by PARP (2007), excluding medium companies [PARP 2007].

²⁰ Study held in Zagłębie Dąbrowskie (2010) concerning medium companies [quoted from: Kubisz 2010b].

ket. The presented diagnosis permits an assumption that there is a weakness and inefficiency within the existing system of recruitment and selection of management staff. In taking employment decisions concerning management positions it would be positive to consider those competencies which are crucial in the knowledge-based economy.

CHAPTER 2.

KEY COMPETENCIES OF MANAGEMENT STAFF

2.1. Desired competencies of management staff

Analysis of research results and opinions presented in professional literature permits a conclusion that a model approach to key competencies of management staff in the knowledge-based economy is missing, especially concerning the Polish economy. However, it should be stated that many authors attempted to create postulate models of managers in different types of economy from planned (socialist) economy to free market economy to economy in transformation to the knowledge-based type [Boyatzis 1982; Lipschitz, Nevo 1992; Pocztowski 1998; Borkowska 1998; Eyde et al. 1999; Alldredge, Nilan 2000; Ghaffarian 2000; Abraham et al. 2001, p. 842-852; Jokinen 2004; Viitala 2005; Marelli, Kondora, Hoge 2005; Naquin, Holton 2006; Tubbs, Schulz 2006; Oleksyn 2006; Borkowska 2006; Draganidis, Mentzas 2006; Rakowska 2007; Sajkiewicz 2008; Kupczyk 2009e; 2013a; Czubasiewicz, Nogalski 2010; Overby, Suvanujasiri 2012; Zając 2012, p. 163-172]. This attempts considered different factors:

- changes which occurred in the environment of enterprises,
- features of economy in which the enterprises operated,
- competencies of the best management staff, selected based on tests and self-assessment,
- identified correlations between competencies and professional and corporate success,
- analysis of recruitment announcements.

Obviously, these approaches cannot be treated as a simple path to efficient management and leadership. They serve only, as stressed by M. Spendlove [2007] as an attempt to capture the gained experience and knowledge of exceptional leaders – for the good of other managers and organisations.

Furthermore, the models discussed by these authors are often diversified and incomplete because of variable definitions of competencies. They make rather a set of postulates concerning key competencies of management staff as adequate to modern economic conditions. However, they are worth comparing as a starting point of selection of potential competencies which may play crucial role in the knowledge-based economy.

For a synthetic listing those competencies were selected which were – within the last decade – the most frequently mentioned by researchers. The following psychological traits were included among desired features of management staff:

- decision making skills, especially in the conditions of intensive effects of many complex and variable factors [Karpowicz, Szaban, Wawrzyniak 1998; Welch 2005; Kupczyk 2009e; Wójcik 2009; Howard, Wellins 2009; A Guide to the Project... 2009; Czubasiewicz, Nogalski 2010, p. 145-146],
- high level of intelligence [Sajkiewicz 2008, p. 93; Skrzypek 2009; Kupczyk 2009e],
- diligence [Kupczyk 2009e], including efficacy [Edersheim 2009], result orientation [Czubasiewicz, Nogalski 2010, p. 145-146] and implementation skills (ability to persuade others into implementation of a selected solution, ability to implement ideas and achieve goals) [Buckingham, Clifton 2003; Rath, Conchie 2008, p. 14],
- openness to experience [Kupczyk 2009e], including creativity, innovativeness [Collins, Porras 2003; Walkowiak 2006, p. 123; Podręcznik Oslo ... 2008; Jabłoński 2009; Czubasiewicz, Nogalski 2010, p. 145-146; Géraudel 2011],
- emotional stability [Sikorski 2006, p. 95; Kupczyk 2009e; 2013a, p. 313-322],
- extraversion [Kupczyk 2009e],
- ability to influence others [Rath, Conchie 2008, p. 14; *A Guide to the Project...* 2009; Czubasiewicz, Nogalski 2010, p. 145-146],
- stress resistance, coping with stress [Yamazaki, Kayes 2004;
 Jabłoński 2009, p. 213],

- building relations [Yamazaki, Kayes 2004; Sikorski 2006, p. 98;
 Rath, Conchie 2008, p. 14; Czubasiewicz, Nogalski 2010, p. 145-146],
- honesty [Penc 2005, p. 69-71; Howard, Wellins 2009],
- communication skills [Czubasiewicz, Nogalski 2010, p. 145-146;
 A Guide to the Project ... 2009],
- high motivation to achieve [Jabłoński 2009, p. 213],
- analytical skillse [Czubasiewicz, Nogalski 2010, p. 145-146],
- transformation abilities, initiating changes of organisational culture (change leader) [Sikorski 2006, p. 111; Marek 2008, p. 160; Jabłoński 2009, p. 213; Czubasiewicz, Nogalski 2010, p. 145-146],
- ability of learning, self-development and developing others [Edvinsson, Malone 2001, p. 23; Hodgkinson, Sparrow 2002, p. 195; Buckingham, Clifton 2003; Rakowska 2007, p. 95; Sajkiewicz 2008; Jabłoński 2009, p. 213; Czubasiewicz, Nogalski 2010, p. 145-146; Morawski 2010],
- leadership [Czubasiewicz, Nogalski 2010, p. 145-146; A Guide to the Project ... 2009],
- strategic thinking [Buckingham, Coffman 2003; Rath, Conchie 2008, p. 14; Czubasiewicz, Nogalski 2010, p. 145-146],
- entrepreneurship [Bartlett, Ghoshal 2004, p. 758-770; Zacher 2007, p. 41-42],
- openness to diversity [Sikorski 2006, p. 95; Wiktorska-Święcka 2013].

It is widely accepted that modern management staff should be very well-educated above all and should have large knowledge [Bolesta-Kukułka 2003, p. 177; Penc 2005, p. 62; Rakowska 2007, p. 95; Sajkiewicz 2008; Plawgo, Kornecki 2010], and especially ability to apply this knowledge [Rakowska 2009, p. 95].

There are several areas of knowledge perceived as crucial for management staff:

- knowledge of economics [Kupczyk 2013a, p. 313-322],
- general knowledge [Kupczyk 2009a; 2013a, p. 313-322],
- specialist knowledge [Rakowska 2007, p. 182; Kupczyk, Cierniak
 -Emerych 2011],

knowledge of problems which concern the enterprise and its staff
 [Kupczyk 2013a, p. 313-322],

- multi-disciplinary and interdisciplinary knowledge [Schuler 2000, p. 4],
- knowledge of ecology [Chodyński 2007].

Among skills which are the most frequently referred to in models of postulated competencies of management staff, there are:

- skills of cooperation, teamwork, creation of network of bonds with network partnerships, mergers [Edvinsson, Malone 2001, p. 23; Zawiślak 2003; Bartlett, Ghosal 2003; Sikorski 2006, p. 116; Walkowiak 2006, p. 123; Jabłoński 2009, p. 213; *A Guide to the Project* ... 2009; Czubasiewicz, Nogalski 2010, p. 145-146; Michalak 2012, p. 36],
- skills to use talents within organisation [Buckingham, Coffman 2003; Jabłoński 2009, p. 213; A Guide to the Project ... 2009; Kupczyk 2010c],
- skills to select and develop human resources [Matthews, Megginson, Surtees 2008; Jabłoński 2009, p. 213],
- skills to manage knowledge, including knowledge sharing, exchange and protection of intellectual property [Sitko-Lutek 2005, p. 261; Sikorski 2006, p. 116; Jabłoński 2009, p. 213; Sajkiewicz 2008; Stocki, Prokopowicz, Żmuda 2008; Marek 2008, p. 160; Kupczyk 2009e; 2013a, p. 313-322],
- skills to operate in a multicultural environment, awareness of and sensitivity to cultural differences, ability to adapt to cultural diversity [May, Puffer, McCarthy 1997; Prahalad 1998; Pocztowski 2002; Zawiślak 2003; Earley, Ang 2003; Walkowiak 2004; Yamazaki, Kayes 2004; Early, Randall 2004; Walkowiak 2006, p. 123; Marek 2008; Gableta 2009; Matusiak, Kuciński, Gryzik 2009; Jabłoński 2009, p. 213; Howard, Wellins 2009],
- skills to consider customer needs and satisfaction, focus on customer [Walkowiak 2006, p. 123; Jabłoński 2009, p. 213; Czubasiewicz, Nogalski 2010, p. 145-146; Kupczyk 2013a, p. 313-322],

- negotiating skills and conflict solving skills [Jabłoński 2009, p. 2;
 A Guide to the Project ... 2009],
- ability to communicate fluently in a foreign language [Kupczyk 2013a, p. 313-322],
- translation of corporate objective to individual employees' goals
 [Gableta 2012; Kupczyk 2013a, p. 313-322],
- ability to think on international scale and to manage international teams [Marek 2008, p. 160].

There are significantly fewer studies on key competencies of management staff in the knowledge-based economy. This is why models of management staff are usually constructed based on ability to manage knowledgebased organisations in their postulated shape and methods of operations. An example was provided by L. Sojka. In his opinion, in the economy of digital era competitiveness of enterprises is determined not by their economic potential, but by their ability to change quickly and to efficiently acquire sources of growth of added value. In this highly complex process chances are held mainly by knowledge-based companies, perfectly flexible and lean - capable to invest and disinvest quickly, organisations of low integration and low fixed costs which use the benefits of matrix structures, smart organisations of developed intellectual assets instead of tangible ones, organisations which invest in their employees and R&D, which have economic intelligence and apply modern theories of solving innovative tasks and use sophisticated integrated information systems, cooperative organisations which seek collaboration and not competition, which implement multiple contracts with suppliers and purchasers and strike strategic alliances with competitors to build a complete and comprehensive market offer without full share of their own assets [Sojka 2007; Krupa 2009]. Interesting results were presented by researchers from the Czech Republic. They attempted to identify key competencies of management staff in knowledge-based organisations based on press announcements concerning recruitment for management positions and on partially structured interviews [Königová, Urbancová, Fejfar 2012]. Analysis of content of the announcements showed that knowledgebased organisations were unanimous only in the case of basic competencies of management staff, i.e. knowledge and expertise of the industry in ques-

tion, university level education and knowledge of at least one foreign language. Among other competencies required the announcements mentioned the most frequently experience in leadership, communication skills, flexibility / easy adaptation, presentation skills, efficiency and responsibility, organisation skills, independence, self-confidence, dynamism and pro-active approach, negotiating skills, analytical skills, diligence, orientation on goals, stress resistance. Other requirements referred to included loyalty, creativity, precision, systemic thinking, decision-making skills, willingness to learn, sense of objective and process orientation [Königová, Urbancová, Fejfar 2012].

The above presented concepts of competencies of management staff do not permit precise definition of a complete set of key competencies in management in the knowledge-based economy, but they are an interesting starting point for further analyses.

2.2. Key psychological traits of management staff

In this section it is attempted to present opinions concerning key psychological traits of management staff in the knowledge-based economy. The search for studies and discussions on these issues, especially within the context of the Polish economy, has not been entirely successful. The scientific discussion in this case is fragmented and focused rather on selected traits. It is specific for the knowledge-based economy to apply knowledge, innovation, information and communication technologies, as well as human capital and its development in order to obtain competitive advantage. Therefore, the research shall concern those psychological traits of management staff which are crucial in these areas. It should be stressed that (as shown by results obtained by many researchers in different cultures) the outstanding competencies which allow for predicting behaviour are universal [Boyatzis 1982; Spencer, Spencer 1993; Wolff 2008] and they allow for forecasting success in particular professions, including management career [Strelau 2000; Dudek, Wichrowski 2001; Hall, Lindzey, Campbell 2004].

Out of psychological traits it seems that in the knowledge-based economy extraversion is important, including sociability, cordiality, assertiveness, activity, searching for impressions and positive emotions [McCrea, Costa 2005]. It corresponds also to openness to others, interest in the world and leadership attitude. Sociability is significant, too, as it defines the number and scope of acquaintances or contacts and it is impossible to succeed in the knowledge-based economy without them. Studies show that high level of extraversion is an important predictor of success in professions which require frequent social contacts and involve high level of autonomy [Barrick, Mount 1991]. Components of extraversion, such as positive emotions, activity and cordiality have a positive correlation with orientation on gaining knowledge and improving one's competencies [Bipp 2008]. Assertiveness, too, is valuable, as it determines dominating and leadership tendencies. Assertive individuals are characterised by easiness to take decisions and to manifest their emotions and preferences [Siuta 2009, p. 34]. Especially the former feature is very important in the knowledge-based economy which forms a variable and risky environment where it is difficult to choose optimal decisions. High level of extraversion is the strongest predictor of orientation on objectives and has a positive correlation with motivation to achieve [Heaven 1990, p. 705-710]. Extraverts get promoted faster, they gain higher remuneration [Boudreau, Boswell, Judge 2001; Seibert, Kraimer 2001, p. 1-21] and higher management positions [Moutafi, Furnham, Crump 2007, p. 272-280]. They cope significantly better with tasks which require focusing on two different things at the same time [Tenenbaum, Bar-Eli 1995] which makes it easier for them to work in the knowledge-based economy. Also searching for experience – a feature of extraversion – may be positive in the knowledge-based economy. Such a person searches for stimulation and takes risky actions. In the world ruled by creativity and innovations, this trait seems indispensable. As confirmed by research, extraversion of management staff is a key to SMEs' access to knowledge, especially technical knowledge. It was also revealed that personality of the president plays an important role in SMEs' ability to innovate [Géraudel 2011].

Considering the knowledge-based economy, another feature – openness to experience – seems very important, too. It is defined as rich im-

agination, searching for new experiences and things, tolerance of change, creativity, innovativeness, broad horizons and broad-mindedness, phantasy, being original, everyday culture, aesthetics, emotionality, holding ideas, orientation on learning, openness to new values. Openness allows for broad perception of information which is a pre-condition of creativity, intellectual curiosity, flexibility of thinking, easy assimilation to new conditions. Openness to experience describes cognitive curiosity and tolerance toward the new [Hall, Lindzey, Campbell 2004; Jarmuż 1998, p. 26-27; Strelau 2000]. Cognitive competencies, such as systems of thinking and patterns of recognition are characteristic for excellent performers in many countries [Campbell et al. 1970; Bray, Campbell, Grant 1974; Boyatzis 1982; Kotter 1982; Luthans, Hodgetts, Rosenkrantz 1988; Howard, Bray 1988; Spencer, Spencer 1993; Goleman 1998; Goleman, Boyatzis, McKee 2004; Boyatizs, Ratti 2009; Cherniss, Grimm, Liautuad 2010]. According to W. Bennis [1999], knowledge-based organisations and "knowledge employees" may be led (not managed) only by open-minded leaders. Great importance of openness to experience for modern managers has been confirmed by many various studies [Necka 2002; Buckingham, Coffman 2004; Kupczyk 2006a; 2009a; 2013a; Sajkiewicz 2008; Jabłoński 2009, p. 213; Michalak 2012]. This trait involves innovations which are crucial in the knowledgebased economy and ensure success in it. Among companies which focused on innovations and succeeded, one may list 3M, Sony, Procter&Gamble or others [Collins, Porras 2003, p. 84-86].

Openness to experience is related to entrepreneurship which seems crucial especially in the case of the knowledge-based economy and innovations. Importance of entrepreneurship and its manifestations as key competency of management staff in general was discussed by many researchers [Schumpeter 1960; 1997; Walkowiak 2004; Jasińska 2012; Michalak 2012]. Entrepreneurship is defined as acting by creative, innovative analysis and solution of problems which occur, perception and skilful use of appearing opportunities and flexible adaptation to changes in the environment [Schumpeter 1960].

An entrepreneurial manager is characterised by motivation to achieve, sense of localised control of enhancements, taking risks, tolerance of uncertainty [Shaver, Scott, Person 1991]. Entrepreneurship is defined also as openness to new ideas and organisational change, readiness for permanent learning, initiative and flexibility, invention and innovativeness, cognitive control over circumstances, striving to mastery, orientation on success enhanced by strong will, courage to diverse from successfully implemented ideas and to search for new solutions to satisfy customer needs [Schumpeter 1960].

Another psychological trait which may be crucial in the knowledgebased economy is emotional stability. It signifies control of emotions and their adequacy [Listwan 2005, p. 108]. It is characteristic for a person who controls their emotions, who is composed, self-confident, stressresistant, realist in thinking [Strelau 2000]. Emotions are a bridge between the rational and irrational approach and they affect creative problem solving [Sayegh, Anthony, Perrewe 2004]. For many years, authors have stressed effect of psychological traits on management success [Boyatzis 1982; 2008a; Goleman 1998; 1999; Jacobs, Chena, Boyatzis, Spencer quoted from: Goleman 1999a 1999b; Nosal, Piskorz 1996; Peters, Waterman 1982; Radkiewicz 1996; Supryn 1996; Dornan, Maxwell 1995; Wilhelm quoted from: Hesselbein, Goldsmith, Beckhard 1997; Dudek, Wichrowski 2001; Kupczyk 2009a; 2013a]. This managerial trait has direct correlation with corporate success [Kupczyk 2013a, p. 313-315]. However, it seems that in the knowledge-based economy, its significance grows. This is a very difficult environment, variable and frequently unpredictable and it requires management staff to reach constantly for new competitive advantages, to develop and to remain psychologically resistant. A literature synthesis by L. Sayegh, W. P. Anthony and P. Perewe [2004, p. 187] proves that in the environment of crisis, large stress, unpredictable situation and time pressure, efficient managers apply strategies based on intuition, using hidden knowledge and adapting the relevant emotional stimulation to the circumstances. This was confirmed by studies concerning air vessels' pilots: they showed that in the case of a threat correct emotional reactions have positive effect on application of hidden knowledge and intuition. Therefore, it is not the cool rational thinking, these are emotions and intuition that play crucial role in decision-making in difficult circumstances, and hence probably in the entire knowledge-based economy.

Intelligence should be an important feature of management staff in the knowledge-based economy. Great significance of the high level of intelligence in the modern circumstances was indicated by G. Hodgkinson and P. Sparrow [2002, p. 195], T. Listwan and M. Stor [2008, p. 106, 112] or A. Rakowska [2007, p. 95]. Intelligence responds for conceptual and logical aspect of undertaken behaviours [Listwan 2005, p. 53], it determines efficiency of information processing, efficacy of learning, cognitive strategies, adaptation to changing external conditions, recognition and association rate, flexibility and capacity of thinking, fast rate of intensive and flawless intellectual work, understanding of correlations, perception of analogies and strategic thinking. Such opinions were presented by K. Bolesta-Kukuła. She stressed that the basis of decisions had come to involve knowledge and understanding based on thinking, associating facts, applying individual style of setting facts in order and referring to intuition [Bolesta-Kukuła 2003, p. 177]. However, based on these studies, one cannot conclude that there are any significant correlations between intelligence of management staff and corporate results in the knowledge-based economy.

The greatest unanimity concerns key significance of management staff's emotional intelligence. Many researchers argue that it is one of the most important competencies of the best managers [Campbell et al. 1970; Bray, Campbell, Grant 1974; Boyatzis 1982; Kotter 1982; Luthans, Hodgetts, Rosenkrantz 1988; Howard, Bray 1988; Spencer, Spencer 1993; Goleman 1998; 1999; Goleman, Boyatzis, McKee 2002; 2004; Wolff 2008; Kupczyk 2009a; 2013a; Boyatzis, Ratti 2009; Cherniss, Grimm, Liautuad 2010]. Its significance seems to grow in the knowledge-based economy. This is so, because the knowledge-based economy is a highly variable environment, of high competition, high level of risks, requiring constant contacts, cooperation and good relations, as well as constant adaptation, openness to customer and employees. Great importance of these competencies in the virtual and networked structures was mentioned by Z. Antczak and A. Kołodziejczyk [2013].

There are three basic groups of competencies included in emotional intelligence [Goleman 1997a; 1997b; Krokowski, Rydzewski 2004]:

- psychological ones (relations with oneself) including self-awareness²¹, self-assessment²², self-control or self-regulation²³ [Boyatz-is 2008a; 2008b; Preston 2008];
- social ones (relations with others) including empathy²⁴, assertiveness²⁵, persuasion²⁶, leadership²⁷ and cooperation²⁸;
- praxeology-related ones (or competencies to act attitude to tasks, challenges and actions) including motivation²⁹, adaptation skills³⁰ and diligence³¹.

Considering significance of particular components of emotional intelligence, there are more differences of opinions, although it seems that the most frequently researchers expose importance of social competencies which are responsible for relations with other people and especially communication and cooperation (Kauffeld, Grote, Frieling 2007; Erpenbeck, Heyse 2007; Boyatzis 2008a; 2008b; Preston 2008; Jabłoński 2009, p. 213; Michalak 2012;

²¹ Self-awareness involves ability to recognise one's own emotional states, knowledge of one's emotions, values, preferences, possibilities and intuitive assessments, i.e. emotional awareness.

²² Self-assessment involves the sense of one's own value, confidence in one's strengths, awareness of one's possibilities, skills and limitations, ability to experience oneself independently from other people's opinions.

²³ Self-control or self-regulation involves ability to consciously react to external stimuli and control one's emotional states; ability to cope with stress, to shape one's emotions by oneself according to one's norms, principles and values.

²⁴ Empathy: ability to experience emotional states of others, awareness of feelings, needs and values held by other persons, i.e. understanding others, sensitivity to other people's feelings; attitude oriented on helping and supporting others, ability to feel and understand social relations.

²⁵ Assertiveness: having and expressing one's own opinions, direct and open expression of one's emotions, attitudes and values without compromising rights and psychological area of others; ability to defend one's rights in social situations without compromising other persons' right to defend themselves.

²⁶ Persuasion: ability to induce others to desired behaviours and reactions, i.e. influencing others; ability to gain others' support for agreement, conflict-soothing skills.

²⁷ Leadership: ability to create visions and motivate people to implement them; ability to gain supporters.

²⁸ Cooperation: ability to create bonds and act jointly with others, teamwork skills for achievement of common goals, ability to perform tasks in teams and to solve problems together.

²⁹ Motivation: one's own commitment, emotional tendencies leading to new goals or making it easier to achieve them, that is striving to achieve, initiative and optimism.

³⁰ Adaptation skills: ability to control one's internal feelings, ability to cope with the changing environment, flexibility in adaptation to changes in the environment, ability to act and take decisions in stressful circumstances.

³¹ Diligence: ability to accept responsibility for tasks and their implementation; ability to gain satisfaction in performing obligations, consistence in acting according to self-accepted standards.

Kupczyk 2013a]. According to researchers, competencies responsible for relations determine transfer of knowledge at enterprises [Hatak, Roesl 2011]. In a study, Chief Executive Officers were asked to describe the most desired traits of newly-employed staff at medium level management positions in technical industries and responses showed that technical skills were near the end of the top ten. The most desired features included: critical thinking, problem solving skills, cooperation, teamwork and team building, oral and written communication and customer relations management [Preson 2008].

In the knowledge-based economy, cooperation and communication are very important. Independence which used to be a key factor of rapid action and entry barrier for competitors, in the new reality has come to be perceived as a symptom of isolation and reason for elimination from the market [Edersheim 2009]. Cooperation and communication are necessary to implement and develop organisational learning, knowledge creation and knowledge management as well as transformation of any enterprise into a smart organisation [Morawski 2006, p. 81; Piepiora 2008; Międła 2008, p. 106; Huk 2008]. In a study, the most wanted features of a modern employee, including management staff, were defined based on an analysis of recruitment announcements. The features were classified in five groups three of which concerned teamwork skills:

- Communication-related features: knowledge of foreign languages, communicativeness defined as ability to express thoughts verbally, to select form and content of a message and method of communication so as not to create communication barriers but to eliminate them, ability to communicate in writing, and especially development of understandable reports.
- Features which determine cooperation with others, including interpersonal skills (skills to strike and maintain contacts, listening skills, emotional intelligence), conflict management, negotiating skills, coping with stress, manners.
- 3. Teamwork skills, disposability, strong motivation and commitment, independence [Rostkowski 2003].

According to Stephen Joyce³² nowadays CQ (communication quotient) should be improved at companies [Goldsmith 2007]. With the current rate and range of change in technological as well as social aspects, it is getting harder to achieve high level of cooperation. At the same time, efficient leaders know that their companies must manifest a growing adaptation ability, mobility and reactivity, starting from the lowest level. Various companies have already implemented principles of CQ. For instance, BMW and Procter&Gamble apply strategies which induce the process of customer cooperation at product designing. The most important features of a team which has a high CQ include: ability to share stress equally and cope with it; achievement of goals through people rather than through programmes; creation of a strong network of bonds and mutual help among the staff, which improves learning and makes it easier to react quickly to challenges [Goldsmith 2007]. In this context, persons talented in integration and communicativeness should be sought among managers [Buckingham, Clifton 2003]. From this point of view, future managers will be responsible to ensure conditions for cooperation:

- shaping an atmosphere of dialogue and cooperation and of creative communication.
- allowing easy access to all members of the organisation,
- promoting any type of originality and individual approach,
- searching for possibilities of inclusion of as many persons as possible in the general dialogue and thus to enhance interrelations and bond individuals in a sense of common goals and values,
- delegating authorisations within tasks,
- establishing partner-like relations inside and outside the company,
- development of mutual interrelations,
- ensuring openness of the organisation,
- promoting internal cohesion of the organisation and ensuring its potential of adaptation in the constant process of change,
- avoiding excessive stiffness of principles, toleration of a certain type of undefined borders [Marshall 1998, p. 212-213; Penc 2005, p. 78].

³² Stephen Joyce, author of the bestseller "Teaching an Anthill to Fetch: Developing Collaborative Intelligence @ Work".

Knowledge-based economy requires focus on customers and employees. From this point of view individual approach is an important competency of management staff [Collins, Porras 2003, p. 84-86; Michalak 2012]. For a person with this trait, uniqueness is the most intriguing; such a person captures intelligently all that is exceptional and outstanding in people and knows what will satisfy another person, what are other persons' strengths and needs, what other person is best at; such a person can select an efficient team [Buckingham, Cliffton 2003]. This competency has always been important, but in the knowledge-based economy its importance grows. In the modern highly specialised business world, it is a challenge to find relevant match between a person and their talents on one hand and a role in organisation on the other. Every person is somehow talented, so it is a manager's task to identify these talents and transform them into achievements in line with the organisation's goals.

In this aspect, awareness of cultural differences is important, too [Puffer, McCarthy 1997; Prahalad 1998; Pocztowski 2002; Zawiślak 2003; Earley, And 2003; Walkowiak 2004; Early, Randall 2004; Marek 2008; Matusiak, Kuciński, Gryzik 2009].

Many successful companies have chosen individual approach in their operating strategies, including Sony, Procter&Gamble, 3M or Johnson & Johnson. Their basic values involves respect, promotion and development of skills of any individual in the company [Collins, Porras 2003, p. 84-86]. Individual approach is expected above all by the modern customers who require fast and flexible adaptation of products to their specific needs [Buckingham, Coffman 2003; Łokaj, Wójcik 2005; Piwoni-Krzeszowska 2007; Sajkiewicz 2008].

From the point of view of the knowledge-based economy, greater attention should be also paid to such competencies of management staff as correct self-assessment and self-confidence. They have always been important [Goleman 1999a; 1999b; Bartkowiak 2000; Majewska-Opiełka 1996; Adamiec, Kożusznik 1996; Dornan, Maxwell 1995; Hill, Stone 1994; Frankowicz 2000; Kupczyk 2006b]. However, in the knowledge-based economy, especially in networked, dispersed organisations, management staff is forced more frequently to take decisions in the conditions of increased risk, uncer-

tainty, reduced, often (only) virtual contact with direct superior. High self-assessment and confidence are difficult to overestimate in such conditions. They provide self-assurance, decisiveness of operations, especially in new, difficult or undefined situations. According to P. F. Drucker, in the knowledge-based economy success is achieved by those who know themselves well, who are aware of their strengths, hierarchy of values and work style, who can manage themselves [Drucker 2003]. M. Jabłoński [2009, p. 122] stresses the complex nature of managers' organisational roles at learning organisations where on one hand they are supervisors in performing their management responsibilities and on the other – as members of teams, they become performers. A manager who is not able to obey decisions by team members or a manager of low self-esteem may limit the "freedom area" of particular employees, hampering processes of organisational learning [Jabłoński 2009, p. 122].

Certainly, leadership may be crucial in the knowledge-based economy, too. However, researchers indicate its new dimension and meaning [Dudek, Wichrowski 2001; Brown 2002; Daft 2003; Buckingham, Clifton 2003; Welch 2005; Silbergh, Lennon 2006; Tubbs, Schulz 2006; McPherson 2009; Walczak 2010, p. 47]. This concept is somehow controversial nowadays. In networked, highly dispersed organisations which communicate mainly by information and communication technologies, effects of leadership seem lesser. Some authors claim, on the contrary, that these conditions require very good leadership skills, especially skills which compose the so-called e-leadership [e.g. Luther, Bruckman 2010].

B. Clegg et al. list leadership as the 7th out of 30 critical factors of successful management of a modern organisation [Clegg, Rees, Titchen 2010]. E. O'Brien and P. Robertson [2009, p. 371-380] found that the changing business landscapes required a different set of leadership competencies. The authors identified 15 leadership competencies, including authenticity, agility, resilience, foresight³³, self-mastery, glocalism, intuition, presence and creativity. Studies showed that management staff of older age missed

³³ Foresight is a method of forecasting based on discussing future among decision-makers (public authorities), scientists, representatives of industry, media, NGOs and public opinion, but the point is not to find a precise prognosis, but to realise perspectives and prepare for the change.

competencies concerning creativity, resistance and glocalism. It is worth it to note the term "glocalism" and to explain it. This is a combination of the words "global" and "local". Glocalism signifies local effects of the global economy and the other way round, meaning in turn that everything is interrelated. Importantly, this concerns not only economic change, but almost any change, including social, cultural, religious, technological, climatic ones etc. For instance, political disturbance in a region of the world may affect costs of natural gas somewhere else or a natural disaster in one country may influence access to production resources in another. Glocalism means also the necessity to adapt a product or service to any culture and regional requirements wherever it is sold. Products should be global and local at the same time. Dion Hinchcliffe [2013] at the blog entitled "Social Media Marketing Predictions 2013, Part I" of the 26th January 2013 argued that glocalism was a new trend which would be enhanced by social media and that most companies were not prepared for this. K. Blanchard [2010, p. 75-90], in response to the modern conditions, suggested the concept of Situational Leadership II in management. Its greatest advantage lies in the postulate of skilful and flexible adaptation of management style to the knowledge and competencies of employees. Actions by a team leader must be relevant to maturity of the team. The greatest advantage of skilful practical application of this concept should be indicated in the fact that results and effects refer to development and improvement of competencies and increase of decision-making independence of employees by their participation in management. Situational leadership consists in combination of four management styles (directing, coaching, supporting, delegating) based on patterns of manager's behaviours: directing and support. The main objective is to make it possible for employees to gain knowledge and improve competencies by adapting a management style which is adequate to the employees' stage of development [Kaczmarek, Walczak 2009, p. 282-284]. J. M. Krouzes and B. Z. Posner [2010] conclude that leadership is a relationship which is based on reliability, support and empowering others. Real leaders change reality by making it better and they are able to appreciate efforts of others and to share the joy of success.

Many researchers believe that ethical approach, morality, honesty and reliability are among the most required competencies of the modern management staff [Collins, Porras 2003; Preston 2008; Walczak 2010, p. 47]. There are also references to significance of focus on principles characteristic for persons who live by unchangeable and fundamental values, require high responsibility and ethics from themselves and others. Such a person can be trusted and is reliable. They are hard-working if the work's objective is consistent with their values [Buckingham, Clifton 2003]. In the knowledge-based economy one can hardly imagine cooperation, sharing knowledge and creative ideas without reliability, trust, openness and sense of security [Kuc 2003; Fleming 2006; Grudzewski et al. 2008; Juchnowicz 2008]. Furthermore, lack of trust in a manager's ethical standards and honesty hampers creativity, commitment and speed of operations [Welch 2005, p. 43]. Nowadays, more and more specialists agree that no economic entity can be successful in long term without knowledge of ethical standards and their regular application in its operations. In highly developed economies, certain ethical standards are enforced by the society and competition. Nonetheless, no board should appoint a manager who finds intelligence more important than righteousness. Such a person always causes damage to the organisation by destroying people – the most important corporate assets, attitudes and performance. Therefore, it is very important to rely on the sense of social responsibility described as ethics in all managerial behaviours [Smoleński 1999, p. 251-252]. Among companies which made these traits their crucial values, there are Boeing, Ford, Procter&Gamble, General Electric [Collins, Porras 2003, p. 84-86].

The presented analysis of published results does not permit development of a complete list of competencies which are crucial in the knowledge-based economy, mainly because majority of presented opinions were based on research of contemporary economy without verifying whether it was based on knowledge or not. However, one may attempt to list those which were referred to the most frequently:

extraversion [Heaven 1990, p. 705-710; Barrick, Mount 1991;
 Tenenbaum, Bar-Eli 1995; Boudreau, Boswell, Judge 2001; Seib-

ert, Kraimer 2001; McCrae, Costa 2005; Moutafi et al. 2007; Bipp 2008; Siuta 2009, p. 34; Kupczyk 2009e],

- openness to experience [Jarmuż 1998; Goleman 1998; Bennis 1999; Strelau 2000; Goleman, Boyatzis, McKee 2002; Nęcka 2002; Hall, Lindzey, Campbell 2004; Collins, Porras 2003, p. 84-86; Buckingham, Coffman 2004; Kupczyk 2006b; 2009a; 2013a, p. 313-315: Boyatzis, Ratti 2009; Cherniss, Grimm, Liautuad 2010; Sajkiewicz 2008; Jabłoński 2009, p. 213; Michalak 2012],
- entrepreneurship [Shaver, Scott, Person 1991; Schumpeter 1960; Walkowiak 2004; Jasińska 2012; Michalak 2012],
- emotional stability [Piskorz 1996; Goleman 1998; 1999a; 1999b;
 Radkiewicz 1996; Supryn 1996; Dudek, Wichrowski 2001;
 Sayegh, Anthony, Perrewe 2004; Boyatzis 2008a; 2008b; Kupczyk 2009a; 2013a, p. 313-315],
- high level of intelligence [Hodgkinson, Sparrow 2002, p. 195;
 Listwan, Stor 2008, p. 106, 112; Rakowska 2007, p. 95; Bolesta-Kukułka 2003, p. 177],
- high level of emotional intelligence [Boyatzis 1982; Kotter 1982; Luthans, Hodgetts, Rosenkrantz 1988; Howard, Bray 1988; Spencer, Spencer 1993; Goleman 1997a; 1997b; 1998; 1999; Goleman, Boyatzis, McKee 2004; Krokowski, Rydzewski 2004; Wolff 2008; Boyatzis, Ratti 2009; Cherniss, Grimm, Liautuad 2010; Antczak, Kołodziejczyk 2013; Kupczyk 2009a; 2013a, p. 313-315],
- individual approach [Collins, Porras 2003, p. 84-86; Buckingham, Clifton 2003; Collins, Porras 2003, p. 84-86; Buckingham, Coffman 2003; Łokaj, Wójcik 2005; Piwoni-Krzeszowska 2007; Sajkiewicz 2008; Michalak 2012],
- correct self-assessment and self-confidence [Hill, Stone 1994;
 Dornan, Maxwell 1995; Adamiec, Kożusznik 1996; Majewska-Opiełka 1996a; Goleman 1999a; Bartkowiak 2000; Frankowicz 2000; Drucker 2003; Kupczyk 2006c].
- leadership [Dudek, Wichrowski 2001; Brown 2002; Daft 2003; Buckingham, Clifton 2003; Welch 2005; Silbergh, Lennon 2006;

- Tubbs, Schulz 2006; MacPherson 2009; Kaczmarek, Walczak 2009, p. 282-284; Walczak 2010, p. 47],
- ethical attitude, morality, honesty [Collins, Porras 2003; Kuc 2003; Fleming 2006; Preston 2008; Walczak 2010, p. 47; Grudzewski et al. 2008; Juchnowicz 2009].

2.3. The most important areas of managerial knowledge

Nowadays, knowledge has become a factor which determines success and development of enterprises, a factor of strategic importance [cf. Toffler 1995; Jaruga, Fijałkowska 2002, p. 13; De la Fuente, Ciccione 2002, p. 23; Zienkowski 2003; Jackson, Hitt, DeNisi 2003; Stańczyk-Hugiet 2007; Marek 2008, p. 161; Janc 2009, p. 38; Kupczyk 2013a]. It should be treated as a source of the company's wealth, main factor of productivity, competitive advantage and economic growth [cf. Rakowska, Sitko-Lutek 2000; Chojnicki, Czyż 2003, p. 203; Onak-Szczepanik 2009; Piech 2009, p. 214]. This concerns knowledge of management staff, too. The analysis of published literature leads to a conclusion that no answer could be given so far to the question what kind of knowledge was crucial in the knowledge-based economy and correlated with corporate results, especially in the Polish situation. This results rather from lack of studies and discussions than from controversies among researchers. Much more frequently, one may encounter opinions on the role of knowledge in economy in general, sometimes with reference to "modern economy" or "contemporary economy" without any precise definition of its features. Furthermore, it should be stressed that many opinions on key knowledge of management staff in the knowledgebased economy are actually postulates, as methodology of research by their authors was not found to separate enterprises which were knowledge-based organisations according to widely accepted criteria and only such a solution would permit identification of potential correlations of knowledge application and certain areas of knowledge of management staff. Despite these limitations, it was resolved to analyse the published opinions. Before con-

tinuing the main analysis, it seems important to explain the term "knowledge", as well as to present its features and types.

Definitions, features and types of managerial knowledge

Knowledge is the whole of an individual's information on a certain area gained by learning or experience and applied by the individual to solve problems. It includes theoretical elements, as well as practical issues, general principles and detailed operational guidelines [Listan 2005, p. 171]. It is also described as a "set of convictions in line with reality, a whole of human skills, erudition, wisdom" [Sobol 2003, p. 1124]. According to the Polish Encyclopaedia³⁴, narrowly defined knowledge is a whole of reliable information about reality along with ability to apply them; and broadly defined – any set of information, opinions, beliefs with attributed cognitive and/or practical value.

Type and level of knowledge and its application aspects depend on people at the organisation's disposition. They are the carriers of knowledge. And if so, one ought to remember the classification of knowledge developed by J. Nonaka and H. Takeuchi, including tacit knowledge, so-called silent, hidden knowledge, impossible to express, and explicit knowledge, accessible and expressible. When referring to a human being, it is justified to speak of personalised knowledge, which is hidden and/or expressible knowledge, can be set in order and presented in words, numbers, signs or symbols and thus it can be delivered to another person [Nonaka, Takeuchi 1995; 2000, p. 25]. The authors describe several features of knowledge: it concerns beliefs and expectations, actions and wishes [Nonaka, Takeuchi 2000, p. 80]. W. Flakiewicz offered a slightly different classification of human knowledge by applying four criteria:

1. Criterion of diversity

- knowledge of facts,
- knowledge of procedures: algorithms, heuristics,
- knowledge of semantics: based on meaning of terms and words,
- knowledge of norms: standards and patterns,

³⁴ PWN Encyclopaedia, online version, encyklipedia.pwn.pl/haslo/3995573/wiedza.html [accessed on the 14.05.2013].

knowledge of structures: concerning structures of phenomena.

2. Criterion of generality

- theoretical knowledge based on formulas, theories etc.,
- empirical knowledge based on observation and experience,
- steering knowledge a synthesis of theoretical and empirical knowledge.

3. Criterion of diversity

- certain knowledge based on facts and proven rules,
- uncertain knowledge partially confirmed by facts and rules,
- hypothetical knowledge based on presumptions,
- ignorance total absence of knowledge of the area

4. Criterion of proximity of the discipline

- specific knowledge: directly linked to the area in question,
- abstract knowledge: general knowledge, models,
- interdisciplinary knowledge: combination of many disciplines of knowledge to describe and analyse a phenomenon [Flakiewicz 2002, p. 36].

According to T. Oleksyn, knowledge required nowadays from management staff – white-collar workers, related to the broadly defined efficiency of their work, is reduced to the following issues:

- content of tasks to be performed and related competencies,
- scope of their responsibilities and autonomy,
- professional development now and in future,
- quality of work which is more important than quantity [Oleksyn 2006, p. 46].

Managers' knowledge is the most frequently interdisciplinary, including knowledge of technical and production issues, organisation, economics and social issues, as well as problems of the organisation in question and conditions of its operations (proximal and distal environment) [Chełpa 2003, p. 51]. For the purpose of the study and book, this definition of managerial knowledge was applied.

Key knowledge of management staff in the knowledge-based economy

The first area of discussion shown in the published literature concerns the level of detail of knowledge. Some researchers argue that general knowledge is more important [cf. Baethge 2004; Baethge, Solga, Wieck 2007]. Others suggest that considering the necessity to manage complexity, diversity, controversies and change in the knowledge-based economy, broad multi-disciplinary and inter-disciplinary knowledge is very important [Schuler 2000, p. 4]. This specific type of knowledge is especially significant for management staff required to manifest high tolerance for diversity and high cognitive motivation [Koźmiński 1999, p. 222]. This knowledge is crucial also because of commercialisation of innovations, including preparation, development and selection of the best business model for the planned undertaking [Garda-Gruszczyńska, Czapla 2010, p. 13]. Key areas of knowledge of management staff concerning commercialisation of innovations at enterprises are:

- knowledge about language, scope of information and forms of conveying information as applied by institutions which may be potential partners in the commercialisation process,
- knowledge of market functioning rules,
- knowledge of sources of information concerning global tendencies in innovations and their application,
- knowledge of forms and procedures of protection of intellectual property,
- knowledge of the process of commercialisation, considering especially the mechanism of innovation transfer [Gwarda-Gruszczyńska, Czapla 2010, p. 14].

Requirements set for management staff concerning knowledge are very broad. A manager should have knowledge of financial management to let them understand financial and accounting information, cooperation of banks, using securities or taxation rules. For purposes of management, knowledge of information technologies is necessary, too, because it makes it possible to use computer-processed data. Managers should also have at least basic knowledge of statistics and mathematics and their applications in eco-

nomics, which allow for taking operational, tactical and strategic decisions. It is also indispensable for them to have knowledge of commercial law, labour law or international law. A modern manager should also hold knowledge on functioning of production systems, their organisation and controlling [Kubik 2005, p. 156].

There is also a discussion concerning background of management staff. Some researchers suggest that at learning organisations education in economics, including elements of law, sociology and psychology is necessary [Jabłoński 2009, p. 213]. Others argue that in the knowledge-based economy no type of background is sufficient to run a company and therefore establishment of multi-disciplinary management teams is necessary [Plawgo, Kornecki 2010]. These authors have observed a correlation of diversified backgrounds of management staff with good corporate results. As evidenced by study results, the best competitive position was achieved by those enterprises which had management staff of diversified background, with no dominating profile (technical, economic or any other). Almost 50% of companies with dominant and strong positions are enterprises of diversified management staff [Plawgo, Kornecki 2010]. It has come to be stressed that in the knowledge-based economy it is important to focus on staff development concerning key competencies of comprehensive nature, such as: creativity, innovativeness, readiness to run independent business considering the involved risks, preparation for project work carried out in teams or independently, knowledge of information technologies and mobile technologies, environmental awareness and promotion of knowledge application in environment-friendly technologies knowledge of foreign languages and lifelong learning [Matusiak, Guliński 2010, p. 146].

Another method to identify key areas of knowledge of management staff is by its correlations with corporate success. Studies have confirmed that some areas of managerial knowledge correlate with corporate success. They include especially knowledge of economics, knowledge and understanding of problems concerning the enterprise and its staff, general knowledge and knowledge of management [Kupczyk 2013a, p. 315-317].

To some extent, researchers may rely on "Europe 2020" Strategy developed for the European Union in identification of key areas of knowledge

which is indispensable for managers of enterprise. The strategy covers three interrelated priorities:

- smart growth: development of an economy based on knowledge and innovations,
- sustainable growth: support for economy which uses resources more efficiently, which is environment-friendly and more competitive,
- inclusive growth: support for economy of high employment to ensure social and territorial cohesion [*Europe 2020* ... 2010].

In this context, undoubtedly, knowledge related to innovations, ICT, human resources and their development, factors which support sustainable development, protection of natural environment and corporate social responsibility will be found crucial.

According to M. Stor, the modern knowledge-based economies which implement innovations, require "learning from the world". Regardless of whether the company aspires to become a global corporation of worldwide success or a national champion, searching for knowledge connected with new technologies or to so-called market intelligence has become indispensable [Stor 2009, p. 34].

Significance of knowledge of technology, especially ICT is mentioned by many researchers. According to D. Tapscott and A. D. Williams [2008], communication revolution, universal access to internet, technologic development, as well as demographic and business changes resulted in a new economic model, present in virtually every part of global economy. This new model, referred to as "wikinomics", is a model in which products and services are invented, manufactured, marketed, advertised and distributed by mass cooperation, often by so-called voluntary digital commons. Members of such communities become global participants of creation processes which in turn require sharing of knowledge – frequently the type of knowledge that would have been protected by intellectual property laws and strictly guarded by enterprises in near past [Tapscott, Williams 2008, p. 10-20]. Success of management staff in this new model of production of goods, referred to as peer production, is obviously determined by knowledge of technology and Web 2.0 tools (websites etc.) which allow their

users to be in the epicentre of activities. However, being in the epicentre involves not only voluntary participation in digital commons which create products. This involves also ability to co-create and co-operate at different social sites which allow for renewing and establishing different sorts of relations, e.g. social, business, professional relations, as well as gaining or sharing specialist knowledge of different domains. Furthermore, one may say in general that the technological factor of the external environment of an international corporation requires management staff to know and apply specialist software used in almost all aspects of professional work and business communication. This knowledge, as mentioned by other authors, is a raw material, starting point or trigger of innovative activities at organisations, and this is the key to modern business. The key to escape from competition nowadays is the scope, depth and diversity of knowledge an organisation can accumulate and use [Doz, Santos, Williamson 2004].

The knowledge-based economy which applies modern ICT knows no borders, and therefore one of its characteristic features is internationalisation. From this point of view, there are three types of knowledge necessary to operate successfully in a foreign culture:

- knowledge of facts concerning history of the country, its politics, economy, institutions, conditions and social relations,
- knowledge of concepts reflection of understanding of norms,
 values, principles and rules deemed important in this country,
- knowledge of attribution highest level of knowledge which protects from improper application of knowledge of facts with knowledge of concepts relevant for the particular situation [Bird et al. 1993, p. 417].

Management staff in Poland finds specialist knowledge very important [Rakowska 2007, p. 182; Kupczyk, Cierniak-Emerych 2011]. For many reasons this is a good attitude, but focus on specialist knowledge confirms the still traditional approach to management.

Necessity to hold knowledge of psychology is often stressed by researchers [Krzakiewicz 2011, p. 77; Cyfert 2011, p. 157]. It is required in cooperation with customers and it involves theories of designing, technical designing, interaction between a human and a computer, marketing, theory of organi-

sation and management of product development, customer characteristics, understanding their goals and profits [Dahlsten 2003], phases of innovative process and customer's role in this process [von Hippel 1998], as well as support forms and methods [Thomke 2003]. Significance of this area of knowledge in the knowledge-based economy was stressed by M. Stor, too, and expanded to include knowledge of sociology. She argued that the social factor in the knowledge-based economy involved mainly the changing demographic structure of current and potential employees, customers, suppliers, contractors, collaborators and cooperating companies etc., or stakeholders simply. These may be internal or external contacts, although in reality it is sometimes difficult to demarcate between these two groups. This in turn required managers to be ready to react to different social needs and able to undertake various interpersonal relations [Stor 2009, p. 44].

As variability and unpredictability of the environment increase nowadays, there is a significant growth in significance of knowledge of forecasts and trends. Management of organisations in such circumstances is reduced to understanding of "generalised uncertainty" resulting from the rate, scope, range and depth of diffusion of changes in the globalised economy which is enterprises' environment [Koźmiński 2004]. Development and implementation of efficient strategies enabling the enterprise to adapt to the changing external conditions and to shape them in accordance to the organisation's objectives, is an essential condition of long-term survival [Pierścionek 1996, p. 9]. There have been published opinions that modern economy approached chaos and consequently few phenomena or processed could be predicted [Skrzypek 2009, p. 34]. Other researchers claim that this is not only possible, but necessary, too. Managers of big companies believe that to achieve success, correct prediction of risks involved in interdependence of world economies is "more important than focusing on advantages" [Polska perspektywa ... 2009, p. 7]. A. Rakowska shares this opinion, as among crucial competencies of managers she lists crisis leadership, which means that they have to learn to predict potential crises [Rakowska 2011, p. 5-19]. Studies held in the USA in 2008 confirmed that understanding of globalisation processes had been considered by human resources management specialists as a key skills of management staff [Critical Skills... 2008]. Hewitt Associates published re-

sults of "Top Companies for Leaders" study of leadership, which revealed that organisational success resulted from leaders' focus on future [Trendy rozwoju przywództwa ... 2010]. In their assessment of the most important sources of competitive advantage of their companies, Polish managers perceived ability to adapt to changes as their crucial strength [Polska perspektywa... 2009, p. 5]. Scientists and professionals agree therefore that management staff's skills to perceive changes and development trends and to develop efficient strategies based on these observations is crucial for modern organisations [Starzyk 2010; Kupczyk, Kubicka 2010b]. Previously, in strategic decision making intuition and managerial experience along with general knowledge of the company's environment sufficed. This was valid especially for small and micro-enterprises. Nowadays, in strategic management, good knowledge of current changes, trends and business cycles is indispensable. According to general opinions, obtaining relevant information has significant effect of improvement of quality of decision-making processes and increase of correctness of decisions taken, therefore it is natural to strive to gain the greatest possible knowledge of customers, competitors, suppliers and other elements of the environment. As M. Harper said: "to manage business it to manage its future" [Dittmann 2009, p. 1].

The presented analysis of the available professional literature on identification of key areas of knowledge of management staff in the knowledge-based economy, especially in the Polish environment, proves that at this stage there is no basis for an attempt of its complete ordering. However, it is valuable to list those components of knowledge which researchers mention the most frequently:

- general knowledge [Baethge 2004; Baethge, Solva, Wieck 2007; Kupczyk 2013a, p. 315-317],
- multi-disciplinary and inter-disciplinary knowledge [Koźmiński 1999, p. 222; Schuler 2000, p. 4; Gwarda-Gruszczyńska, Czapla 2010, p. 13],
- knowledge of economics [Jabłoński 2009, p. 213; Kupczyk 2013a, p. 315-317],
- knowledge of commercial law, labour law, international law [Jabłoński 2009, p. 213],

- knowledge of ecology [Matusiak, Guliński 2010, p. 146],
- knowledge of problems concerning the enterprise and its staff [Kupczyk 2013a, p. 315-317],
- knowledge of technology, especially ICT [Doz, Santos, Williamson 2004; Tapscott, Williams 2008; Matusiak, Guliński 2010, p. 146],
- specialist knowledge [Kubik 2005, p. 156; Rakowska 2007, p. 182; Kupczyk, Cierniak-Emerych 2011],
- knowledge of psychology [Krzakiewicz 2011, p. 77; Cyfert 2011, p. 157],
- knowledge of changes, forecasts and development trends [Starzyk 2010; Kupczyk, Kubicka 2010b].

2.4. Key skills of management staff

The next component of key competencies of management staff in the knowledge-based to be analysed involves skills. An analysis of the published studies of this area led to a similar conclusion as in the case of knowledge: that there has been no set of them identified, especially for the Polish economy. Although researchers indicate key managerial competencies, but they usually refer to the modern economy, without defining whether they mean the knowledge-based economy or not. These are rather postulates concerning usefulness of particular skills for needs of the knowledge-based economy. The published opinions are very interesting, but none were preceded by empirical research that would allow for selecting those enterprises which were already knowledge-based and then for identification of those competencies of management staff which correlated with corporate results in such circumstances. However, since there are no empirical studies implemented in the Polish economic environment, then certainly it is valuable to discuss the published opinions, even those concerning only selected competencies, and to attempt to develop a complete set based on those opinions. Even if the literature research in the discussed area is not satisfactory, still, any indepth study of key competencies of managers opens a way to development and improvement of management of organisations [Fardmanesh, Ebrahimi, Taheri 2012].

Types of managerial skills

According to the dictionary of basic terms related to the national system of qualifications (National Qualifications Framework) skills involve ability to perform tasks and solve problems characteristic for the learned area or for professional activities³⁵. In this book, managerial skills shall be defined according to the proposition by S. Chełpa, as psychological traits and knowledge which are reflected by professional behaviours manifested by the manager [Chełpa 2003, p. 51]. R. L. Katz [quoted from: Stoner, Freeman, Gilbert 1994, p. 26-29, 35-36] classified skills necessary for any manager in three basic groups. These are:

- technical skills: competency in using procedures, techniques and specialised knowledge,
- human relations skills: ability to work with, understand, and motivate other people,
- conceptual skills: intellectual ability to coordinate and integrate interests and operations of the organisation [Stoner, Freeman, Gilbert 1994, p. 26-29, 35-36].

Based on a research on more than 400 managers, D. Whetten and K. Cameron drew special attention to two groups of skills: personal and interpersonal skills. The former group included:

- developing self-awareness, ability to identify and express one's values and priorities, as well as ability to use this skill in practice,
- managing personal stress, ability to define stress factors and eliminate them, ability to manage time and delegate tasks,
- solving problems analytically and creatively, ability to think out of the box, to induce innovative tension in others.

The interpersonal skills' group included:

³⁵ Cf. www.kwalifikacje.edu.pl/pl/slownik/65-umiejetnosci [accessed on the 30-6-2013].

 building relationships by communicating supportively: ability to maintain communication, to speak and listen efficiently, to develop others,

- gaining power and influence: ability to apply social influence, to affect others with one's authority,
- motivating others,
- managing conflict [quoted from: Rakowska, Sitko-Lutek 2000, p. 23].
- R. W. Griffin added further three basic managerial skills to those listed above:
 - communication this skill involves the manager's ability no only to convey ideas and information effectively, but also to receive them, communication helps also in understanding any letters, written messages or reports,
 - decision making this is a manager's skill to diagnose and define problems and opportunities correctly and then to select the right method of action in order to solve problems and use opportunities to the full,
 - time management with this skill, a manager can manage their time efficiently, set priorities and delegate tasks and responsibilities [Griffin 2004, p. 19-22].

Managerial skills can be further divided into functional skills (related to leading and control of relevant logistics functions) and general management skills concerning management of an enterprise as a whole [Ansoff 1985, p. 108]. Considering objectives of this book, the analysis concerned those skills of management staff which are crucial in the knowledge-based economy, hence basically those related to knowledge, innovation, ICT, human capital and its development.

Skills related to transfer of knowledge and innovations

P. F. Drucker argued that the crucial competency in the knowledge-based economy was a skill of knowledge-based management which involved productive application of knowledge. In his opinion such management concerned especially people, and not techniques or procedures [Edersheim

2009, p. 25, 42]. Similarly, other authors stressed importance of management of knowledge and knowledge staff³⁶ [Kisielnicki 2003; Morawski 2006b; Kupczyk 2013a; Antczak 2013]. According to Z. Antczak, key skills in the knowledge-based economy are those which make it possible to operate in the global economy, as well as to shape within the organisation an awareness of importance of transfer of knowledge and innovation for development of the entire business [Antczak 2013, p. 56]. Markedly, researchers are exceptionally unanimous in the opinion that among the most important skills of a manager there is a skill to make innovation a factor of competitive advantage of the enterprise [Gupter, Carpenter 2009; Michalak 2012, p. 36; Antczak 2013, p. 56]. Multiple study results have confirmed existence in highly developed countries of correlations between competencies of employees, including management staff, and development of innovations at enterprises [Taylor, laBarre 2007; Grabowska, Drygas 2010; Awa et al. 2012] and further correlations between development of innovations and excellent corporate results [Brinkley 2006; Innowacyjność ... 2010; Strategia Europa 2020 ... 2010; Innovation Union ... 2010; 2011; Plawgo, Kornecki 2010]. Therefore it seems settled that management staff's focus on support of innovation at enterprises is critical [Gupter, Carpenter 2009] and so is the skill of innovative management³⁷ [Penc 2013]. This framework includes also an ability to develop relevant action strategies, and then quick marketing of products and services based on high-tech [Gwarda-Gruszczyńska, Czapla 2011, p. 5]. Key skills of management staff concerning commercialisation of innovations at enterprises should be mentioned, too. These are:

 ability to analyse market potential of an innovation and market needs,

³⁶ Skills of management of knowledge and knowledge staff are defined here as overall processes that enable creation, diffusion and application of knowledge to achieve objectives of the organisation, e.g. location, acquisition, development of knowledge, knowledge sharing and diffusion, knowledge application and maintenance.

³⁷ According to J. Penc, innovative management makes it possible to manage efficiently an entire innovative process including overall operations related to identification of needs, preparation, development and implementation of an innovation, and then its market verification. Such management nowadays is strictly related to strategic management, because innovation without a strategy may be ineffective, and its establishment and implementation may be much more difficult [Penc. 2013].

skill of comprehensive approach to the process of commercialisation and selection of forms of intellectual property protection,

- ability to select tools of organisational communication and methods of interpersonal communication for specific needs of business partners,
- ability to synthesise and draw conclusions and to find information [Gwarda-Gruszczyńska, Czapla 2011, p. 14].

Researchers believe that management of technological innovations which are characteristic of the knowledge-based economy requires stricter association with human capital. In future that will involve greater focus on human needs and values of members of the organisation and social community affected by these innovations [Fleury, Fleury 2005]. This situation will set new challenges for management staff. Visionary organisations, such as 3M, Sony, Boeing, Procter&Gamble or Johnson&Johnson focus in their strategies on respect for and promotion of talents and creativity of their employees and on ensuring the staff's needs, they respect individuals and their development, individual initiatives, quality, ethics, reliability and striving to perfection [Collins, Porras 2003, p. 84-86]. For implementations of innovations, it is necessary that management staff can involve employees in the process, but customers, too [Kotler, Keller 2009]. Customers' competencies' role in co-creation of successful innovations was indicated by many studies and researchers [Prahalad, Ramaswamy 2000; Kotler, Keller 2009].

Customer focus skills

Modern enterprises in the knowledge-based economy make them products entirely subjected to needs and preferences of their customers. Entire decision-making processes, especially in management concerning production and innovation are determined by customers' behaviour and interests [Berthon, Hubert, Pitt 2004; Oudshoorn, Rommes, Sienstra 2004; Ogawa, Piller 2006; Saastamoinen et al. 2007; Coya, Dalli 2009; Gupter, Carpenter 2009]. Customers are involved at all stages of product development, especially specification, conceptualisation, engineering design and prototyping [Fiore et al. 2001]. One may even say that customers' competencies, experience

and creativity are applied to co-create innovations [Prahalad, Ramaswamy 2000; Arvidsson 2006; Ondrejka 2007]. It is accepted that the bottom-up approach is indispensable to co-generate new value with contacts and relations with customers [Prahalad, Ramaswamy 2000; Vargo, Lusch 2004; Berthon, Hubert, Pitt 2004; Oudshoorn, Rommes, Sienstra 2004; Łoboda, Sitko-Lutek 2007, p. 21-23]. In this context another key managerial skill becomes evident: permanent focus on customers and ensuring satisfaction of their needs [Jabłoński 2009, p. 213; Kupczyk 2013a]. Never before have customers had so much to say. Nowadays, it is the customer who takes over control of companies, refusing to be a passive recipient of goods and services. Consumer groups are a channel for individual customers to affect production processes by internet tools (blogs, e-stores, access to virtual shopping, virtual meetings etc.). Without customer focus no organisation can last and succeed in a long term nowadays. A purchaser expects fast and flexible customisation of products to their needs [Drucker 2003; Sajkiewicz 2008; Łokaj, Wójcik 2005; Piwoni-Krzeszowska 2007]. Some enterprises have already implemented such attitude toward customers, e.g. General Electronic or Johnson&Johnson [Collins, Porras 2003, p. 84-86]. It should be stressed that such an extensive participation of customers in decision-making processes of enterprises was possible due to information and communication technologies.

Skills of application of ICT

The term "information and communication technologies" (ICT) describes a range of technologies to process, collect and transfer information electronically. Skills of application of ICT by management staff involve such elements as information acquisition (internet, e-libraries, data warehouses), e-commerce, distance working, distance learning, management support (e.g. operational processes and decision-making), teamwork, communication.

Researchers agree that nowadays these technologies have become a necessity [Rostkowski 2003; Economist Intelligence Unit... 2008; Penc 2011, p. 319; Wang, Haggerty 2011; Michalak 2012; Kupczyk 2013a]. Certainly, it is affected by marked improvement of corporate results achieved by some companies due to participation in the digital economy [Heiskanen,

Hyvönen 2006]. This is why management staff should take action to develop these competencies within organisations. This was compared empirically in research by N. Haggerty and Y. Wang of University of Ontario, proving necessity to involve managers in shaping of employees "virtual" competencies. Among those competencies, the researchers listed: (1) virtual social competencies, i.e. competencies, i.e. those related to building online relations; (2) skills of application of social media tools; and (3) virtual efficiency which arises from self-confidence. They believe that effort should be taken especially to develop such skills as: communication with text as a main carrier of information, finding information through various media, independence in learning new functionalities of online tools and tolerance of constant availability online. If a company is interested in online cooperation, flexible employment, application of mobile devices in communication, then it should put greater stress on diagnosing the level of virtual competencies of the staff and on improvement of those competencies [Wang, Haggerty 2009]. Not always supervisors accept "surfing on the net" at work. However, studies show that it improves atmosphere at work and makes human activity more efficient. Psychologists have evidenced that surfing on the net stimulates brain development and parts of brain which are responsible for decision making and complex thinking [quoted from: Budzioch 2009]. Management staff should ensure application of information and communication technologies at enterprises also for education and development. Distance education is increasingly based on mobile education technologies which make it much more accessible. Depending on the type of classes (synchronous or asynchronous) one may participate in a course not only by a notebook, but also by palmtop, iPod, PSP or MP3 player [Plebańska 2011, p. 202-204]. Hence, mobile learning means that the educative programme is available for anyone who owns a cell phone or tablet. It is estimated that so far, only 10% of organisations apply m-learning, but a further 40% plan to implement it in near future [Filipowicz 2011, p. 5]. Therefore, ICT allow for an easier, cheaper and faster supplementation of knowledge and skills. It is worth noting that modern learning on the internet evolves toward even further customisation, characterised by no formalism and knowledge sharing. It is said that e-learning evolves into we-learning nowadays [Bersin 2009; Gajewski 2009, p. 56] where – contrary to traditional and passive methods of teaching – focus is on content created by users, modified by other users and on shared resources [Chrzanowska 2011, p. 20]. We-learning is based on social relations among participants of training. In this context, it is possible to share experiences, to engage in dialogue and to reach interesting conclusions [Pindelski 2010, p. 79]. We-learning applies Web 2.0. The most popular tools in this group include Wiki mechanisms, blogs, file sharing services (podcasting, videasting, video or picture sharing etc.), social media [Dąbrowski 2008, p. 37-44]. With technological progress it has become possible to apply particular online training tools comprehensively.

Even now, business applies such complex methods as knowledge and skill pills, webquests³⁸, webinars³⁹, e-assessments, e-coaching and self-coaching [Chrzanowska 2011, p. 20; Smółka 2012, p. 72-75]. Management staff should therefore follow developments of ICT and promote their application within the organisations, as well as indicate the resultant advantages. By advanced methods of analysis of social networks (social network analysis) researchers have found, for instance, that members of an organisation who exchange more e-mails with their supervisors, achieve better results and generate \$588 more profit for the company than distanced employees who have correct and formal relations with their managers [*Po ile mail do szefa?* ... 2012]. However, it is worth noting that application of ICT generates problems, too. According to B. Brown, globalisation pressure pushed organisations in western countries to implementation of outsourcing and off-shoring⁴⁰, strategies, which means

³⁸ Type of a project method oriented on student research based on an instruction placed at a website. The basic source of information for participants is the internet. Online sources may be enriched with other materials. Webquest form is similar to a traditional project with online elements. Therefore it corresponds the best to the term of blended learning. Webquest is often organised as a group exercise with each group providing another element of the project – other tasks. Division into groups has its motivating function because it usually involves undertaking a certain role [Wilk, Szafraniec 2010].

³⁹ Webinar is a type of an online seminar held and organised by webcast technology which allows for bilateral communication between the person who holds the meeting and its participants thanks to virtual tools. It is supposed to look like a traditional meeting and to allow contact despite large distances. Webinars serve two goals mainly: as training tools and for business contacts.

⁴⁰ Offshoring means shifting selected business processes of the enterprise to another country, maintaining the same customer group. It concerns such processes like production, services or procurement and it is aimed to reduce costs. Offshoring may be carried out by investment or commissioning international subcontracting [Mińska-Struzik, Nowara, Truskolaski 2007, p. 53].

that leaders actively work basically as online leaders, taking responsibility for leading decision-making centres based far away, located in other countries, other time zones, frequently applying only asynchronous communication, often without any face-to-face meetings [Brown 2002; Silbergh, Lennon 2006]. This situation requires more efficient leadership skills, other than those based on direct contact [Daft 2003].

Skills related to management of human resources

Knowledge-based economy requires management staff who can focus on human capital more, who can manage it better and ensure its development [Penc 2000, p. 349; Walczak 2010, p. 47; Krzakiewicz 2011, p. 74; Kupczyk 2013a]. As mentioned by A. Pocztowski [2007, p. 293], knowledge staff has a growing influence on generating added value and the related competitive advantage of the enterprise. Therefore, management staff must ensure high quality of products and attractive price, maintain customers and their loyalty to ensure profit and development of the company, but also make it an attractive working place, institution which is friendly to its environment. Above all, enterprises should invest in human capital and increase their intellectual capital, because it will be a crucial condition of their capacity and of establishment of organisations to match tomorrow's social requirements which indicate clearly integration of economic efficiency with humane rules of management [Penc 2010a].

It is worth stressing that investments in human capital and correct talent management have positive effect on corporate results [Kupczyk 2010c; Collings, Mellahi 2009].

Gallup Institute researchers studied more than a million teams and interviewed more than 20 thousand leaders and more 10 thousand people who cooperated with leaders to verify what the most efficient leaders were doing best. It turned out that they selected right people and invested in their strengths [Rath, Conchie 2008]. That's why the approach to search for what is the best in people not only improves the atmosphere – it may benefit business, too [Bolchover 2009]. According to A. Pocztowski, management staff

should be able to perform human resources tasks so as to fulfil contemporary requirements from employees, including:

- honest, ethical treatment and respect for their dignity,
- seeing them as stakeholders and not only subordinates,
- appreciation and rewarding of their contribution to the organisation,
- organisational support for their development and improvement of their competencies [Pocztowski 2007, p. 172].

Managers should be able to apply the potential of every person and to consider individual features to the group's interests and to achieve the defined tasks [Jabłoński 2009, p. 213]. Therefore, human capital should be treated in the relevant why by superiors as an investment by:

- intensification of their professional development by constantly defining ambitious tasks,
- involvement in performance of tasks to make them a part of the organisation and to increase their commitment,
- delegating mentors for employees to plan their further development,
- appreciation of their strengths,
- recognising and rewarding their contribution to achieved results [Axelrod, Handfield-Jones, Michaels 2006, p. 105].

Therefore, it seems necessary that management staff can implement organisational culture to promote values, greater focus on organisational objectives with consideration of employees' goals and interests [Gangani, McLean, Braden 2006; Walczak 2010, p. 47; Krzakiewicz 2011, p. 77], their better understanding and motivating [Cyfert 2011, p. 157].

In this context, key competencies of management staff should include ability to learn, to update one's knowledge, to develop constantly and to develop employees [Penc 2000, p. 322, 349; Listwan, Stor 2008, p. 106; Wasiluk 2009; Foltyn 2009, p. 149; Chmielecka 2011]. T. Oleksyn [2006, p. 92] wrote that "in the times of knowledge-based economy, this capability has become the leading one". This competency is critical also because many studies confirm the effect of management staff's competencies on the process of corporate learning [Jabłoński 2009; Rakowska 2007; Sitko-Lutek, Skrzypek 2009] and schemes of improvement of employees' competencies are among the most efficient methods of increasing economic innovative-

ness of regions [Regionalne systemy innowacji ... 2013]. Currently, the most wanted managers are those who can induce complete development of individual employees' potential and their responsibilities and those who can set a common direction for the entire organisation [Krzakiewicz 2011, p. 74]. Therefore, it seems necessary that management staff can support employee development, let employees decide and take up larger responsibility [Gangani, McLean, Braden 2006].

Among the most frequently mentioned key competencies of management staff in the current circumstances, there is also communication, especially cross-cultural communication [Listwan, Stępczak 2004; Stor 2008, p. 209-210; Listwan, Stor 2008, p. 106; Fołtyn 2009, p. 149; Penc 2010a; Bendkowski, Bendkowski 2011, p. 37; Krzakiewicz 2011, p. 77; Antczak 2013, p. 56]. Studies by the company Golden Mark indicated that communication orientation is one of the most important competencies of persons who achieve significant success [Pocztowski 2008, p. 41]. This fact was confirmed also by other studies held at more than two thousand companies in Moravia-Silesia: entrepreneurs indicated efficient communication as the most important soft skill [Wójcik 2009].

In the knowledge-based economy, because of its global range, cross-cultural communication plays a special role. According to M. Stor, it covers linguistic skills, emotional, perceptive, cognitive, analytical, interpersonal skills, synthesis, interpretation, adaptation and identification skills [Stor 2008, p. 209-210]. It involves such forms of collection, storing, analysing, processing and application of knowledge about the other culture as to contribute to coding and decoding transmitted information as expected by participants of the communication process [Stor 2008, p. 207]. The most important intercultural competencies of management staff include ability to cope with uncertainty, ability to control one's emotions, proficiency in the foreign language [Oleksyn 2006, p. 48-50; Lachiewicz 2007, p. 233; Listwan, Stor 2008, p. 106; Stor 2009; Kupczyk, Cierniak-Emerych 2011] and ability to express respect to norms and values of other people [Murdoch 1999, p. 173-216; Schneider, Barsoux 2005, p. 88-104; Stor 2006; Shapiro, Ozanne, Saatcioglu 2008].

There is also a marked unanimity of researchers' opinions concerning significance of cooperation and teamwork skills in the knowledge-based economy [Penc 2000, p. 349; Gupter, Carpenter 2009; Krzakiewicz 2011, p. 77; Antczak 2013, p. 56], as well as of skills to build relations, correlations and interactions [Sikorski 2006, p. 98]. It is hardly surprising, since they are necessary in order to acquire and diffuse dispersed knowledge and to build long- and short-term bonds with various groups (previous co-operators and rivals) according to various needs and tasks [Michalak 2012, p. 36]. In the near future, complexity of knowledge, techniques and technologies will grow, increasing the role of interactions between companies and other entities as a method to gain specialist knowledge [*Podręcznik Oslo* ... 2008, p. 30]. Partners have to accept to lose some independence and to invest in mutual relations [Szpringer 2008, p. 9-10].

Interdisciplinary approach to managerial skills

Searching for key competencies in the knowledge-based economy does not permit focus exclusively on those related to knowledge, innovations, ICT, human capital and its development. It turns out that the higher advancement of the knowledge-based economy, the higher requirements concern management staff's competencies. Researchers apply a more interdisciplinary approach and list also other skills as important. Those include specialist skills [Krzakiewicz 2011, p. 77; Cyfert 2011, p. 157], crisis management [Antezak 2013, p. 56], project management, especially concerning complex and international projects [Antezak 2013, p. 56; Lachiewicz 2007, p. 233], diversity management [Penc 2000, p. 349; Kubicka 2009a, p. 59-82] or management of sustainable development and corporate social responsibility [Krzakiewicz 2011, p. 77; Kubicka 2010a]. Researchers indicate also other very important skills: change management [Mikołajczyk 2010, p. 274-291; Cyfert 2011, p. 157], especially management of changes related to evolution of the environment [Olszewska, Kubicka 2011], forecasting and focus on future [Krzakiewicz 2011, p. 77; Cyfert 2011, p. 157], as well as decision making in the environment of intensive competition and high uncertainty [Schermerhorn 2008, p. 25]. There are also proponents of significance of

analytical skills, diagnosis and multidimensional thinking [Gans, Stern 2003; Gwarda-Gruszczyńska, Czapla 2011; Cyfert 2011, p. 157], communication with stakeholder groups [Antczak 2013, p. 56] and striking cooperation with universities and R&D sector [Lachiewicz 2007, p. 233; Antczak 2013, p. 56].

Desk research and opinions by researchers presented above allowed a conclusion that the issue of key competencies of management staff in the knowledge-based economy is hardly identified, especially in Poland. There are not enough empirical studies, discussions and conclusions. However, one may list the most frequently mentioned managerial skills:

- knowledge-based management, management of knowledge and knowledge staff [Kisielnicki 2003; Morawski 2006b; Edersheim 2009, p. 25, 42; Kupczyk 2013a; Antczak 2013],
- skills to make innovation a factor of competitive advantage [Taylor, laBarre 2007; Gupter, Carpenter 2009; Grabowska, Drygas 2010; Gwarda-Gruszczyńska, Czapla 2011, p. 14; Michalak 2012, p. 36; Awa et al. 2012; Antczak 2013, p. 56; Penc 2013],
- customer focus skills [Prahalad, Ramaswamy 2000; Fiore, Lee, Campbell 2001; Drucker 2003; Berthon, Hubert, Pitt 2004; Oudshoorn, Rommes, Stienstra 2004; Łokaj, Wójcik 2005; Ogawa, Piller 2006; Arvidsson 2006; Saastamoinen et al. 2007; Ondrejka 2007; Piwoni-Krzeszowska 2007; Sajkiewicz 2008; Cova, Dalli 2009; Gupter, Carpenter 2009; Jabłoński 2009, p. 213; Kupczyk 2013a],
- application of ICT [Rostkowski 2003; Economist Intelligence Unit ... 2008; Penc 2011, p. 319; Wang, Haggerty 2011; Filipowicz 2011, p. 5; Michalak 2012; Kupczyk 2013a; Brown 2002; Silbergh, Lennon 2006],
- human capital management [Penc 2000, p. 349; Axelrod, Handfield-Jones, Michaels 2006, p. 105; Gangani, McLean, Braden 2006; Pocztowski 2007, p. 172; Rath, Conchie 2008; Bolchover 2009; Jabłoński 2009, p. 213; Walczak 2010, p. 47; Penc 2010b; Krzakiewicz 2011, p. 74; Cyfert 2011, p. 157; Kupczyk 2013a],
- learning skills, knowledge updating, constant development [Penc 2000, p. 322, 349; Oleksyn 2006, p. 92; Gangani, McLean, Braden

2006; Rakowska 2007; Listwan, Stor 2008, p. 106; Wasiluk 2009; Sitko-Lutek, Skrzypek 2009; Fołtyn 2009, p. 149; Jabłoński 2009; Chmielecka 2011],

- communication in foreign languages [Oleksyn 2006, p. 48-50;
 Lachiewicz 2007, p. 233; Listwan, Stor 2008, p. 106; Stor 2009;
 Kupczyk, Cierniak-Emerych 2011],
- cooperation and teamwork skills [Penc 2000, p. 349; Sikorski 2006, p. 98; Gupter, Carpenter 2009; Krzakiewicz 2011, p. 77; Antczak 2013, p. 56],
- specialist skills [Krzakiewicz 2011, p. 77; Cyfert 2011, p. 157],
- project management [Antczak 2013, p. 56; Lachiewicz 2007,
 p. 233; Kupczyk, Kubicka 2013a],
- diversity management [Penc 2000, p. 349; Kubicka 2009a, p. 59-82],
- management of sustainable development and corporate social responsibility [Kubicka 2010b; Krzakiewicz 2011, p. 77; Kupczyk, Kubicka 2013b],
- change management [Mikołajczyk 2010, p. 274-291; Cyfert 2011,
 p. 157],
- forecasting [Cyfert 2011, p. 157; Krzakiewicz 2011, p. 77].

Further, it should be noted that nowadays there are very stringent requirements concerning competencies of management staff. The desired and expected level of skills is so high and interdisciplinary that it may be impossible to achieve for individuals. This issue is worth discussing and managerial skills should be more focused on management aspects, with promotion of cooperation for acquisition of the desired knowledge and skills at enterprises.

CHAPTER 3.

METHODOLOGY OF THE ORIGINAL RESEARCH

3.1. Research objectives and questions, hypotheses, terminology

This part of the work describes the results of the original empirical research. The main objective of the research was to identify key competencies of management staff in the knowledge-based economy based on opinions of representatives of Lower Silesian enterprises.

There were also other specific objectives of the empirical research, including:

- Specific objective no. 1: Identification of correlations between competencies of management staff in Lower Silesia with the output of enterprises in the knowledge-based economy.
- Specific objective no. 2: Determination of the competencies gap in the studied management staff in Lower Silesia concerning those competencies which are crucial in management in the knowledgebased economy.
- Specific objective no. 3: Development of a model of competencies of management staff which are crucial in the knowledge-based economy and their correlation to corporate output.

Those objectives were also related to the practical goal of the empirical research, which involved development of recommendations concerning potential modification and improvement of the studied management staff's competencies in order to enable elimination of the existing gap concerning those competencies which are crucial for management in the knowledge-based economy.

The empirical study conducted was aimed at answering the below research questions by providing an explanation that can be regarded as probable:

Research question no. 1: Which competencies of management staff are crucial in the knowledge-based economy?

Research question no. 2: What, if any, correlations are there between competencies of management staff and corporate results in the knowledge-based economy?

Research question no. 3: Is there a gap in management staff's competencies which are crucial in management in the knowledge-based economy?

In the preparation phase the following operational hypotheses have been applied:

Hypothesis no. 1 (H1): In the knowledge-based economy some competencies of management staff have become crucial.

Hypothesis no. 2 (H2): There are correlations between competencies of management staff and corporate results in the knowledge-based economy.

Hypothesis no. 3 (H3): There is a competencies gap in management staff concerning competencies which are crucial in the knowledge-based economy.

Two criteria were considered in selection of the sample: sex and level of management.

It seems necessary to describe the terminology applied in the discussed research. For the basic terms, those were defined in sections 1.1, 1.2, 2.1, 2.2 and 2.3, but it is valuable to come back to them and expand the explanations by defining their components. It was assumed that crucial competencies of management staff in the knowledge-based economy are psychological features, knowledge and skills which are important or very important in management in the knowledge-based economy. Psychological features are defined as predispositions for certain behaviours of certain beyond-situation stability. Due to this stability, the person's behaviour in different conditions is similar, as a relatively permanent, recognisable and individual-specific, typical behavioural pattern [Listwan 2005, p. 20; Eyre, Smallman 1998; Zimbardo, Ruch 1994]. They include personality, temperament and intelligence [Chełpa 2003; Listwan 2005, p. 20]. For describing personality features a five-factor personality model and five-factor personality theory ("Big Five" model) are applied [cf. McCrae, Costa 2005; 2008; Siuta 2006; 2009; Oleś 2000, p. 406-410] including such traits as: extraversion vs. introversion, agreeableness vs disagreeableness, conscientiousness vs. carelessness, emotional stability vs. neuroticism and openness to experience vs. cautiousness. Chełpa's stand is accepted that temperament

is a psychological trait which is responsible for style and dynamism of behaviour. It consists of reactivity, activity, mobility, time of reaction, speed and permanence. Reactivity is sensitivity to stimulation and need for stimulation on one hand and on the other – resistance to strong, long-lasting or recurring stimuli. Activity defines intensity and frequency of taken actions, while mobility concerns transfer from one activity to another. Time of reaction relates to reaction to external stimuli, speed is frequency of occurrence of uniform activities in a given period of time, while permanence concerns persistence of a reaction after expiry of the stimulus [Listwan 2005, p. 162].

Intelligence is responsible for the conceptual and logical aspects of the individual's behaviour ("understanding what you do"). It consists of fluid intelligence (so-called intellectual potential), independent of the knowledge held, related to "pure" intellectual processes, conditioning their rate and reliability (e.g. rate of recognition, associations, thinking flexibility and capacity, originality of thinking) and crystallised intelligence, including terminology schemes, deduction rules and strategic thinking patterns fixed in individual experience (e.g. understanding and defining terms, knowledge, interpretation of equivocal situations, creation of metaphors, perception of analogy, reduction of information (Listwan 2005, p. 53-54]. Intelligence and intellect are not the same, although their meaning is similar. In the work they are treated as synonyms, because, as evidenced by pilot study, management staff often uses them as equivalent. Finally, in the research phase, intelligence/intellect was defined as agility of information processing, efficiency of learning, cognitive strategies, adaptation to the changing environment, rate of recognition, associations, flexibility and capacity of thinking, fast rate of intensive and flawless intellectual work, defining terms, understanding correlations, perception of analogies and strategic thinking. A manager's knowledge is assumed to include knowledge of technology and production issues, organisation, economic and social issues, as well as problems and conditions of operations of the managed entity (including its close and distant environment) [Chełpa 2003, p. 51]. Psychological traits and knowledge are defined to be reflected in management staff's professional behaviour – skills [Chełpa 2003, p. 51]. In the research, the knowledge-based economy is defined as an economy in which knowledge is created, learned, shared and used more effectively by those enterprises which rely on knowledge as their competitive advantage.

Management staff is defined according to T. Listwan's definition as a population of employees of a formal organisations (enterprises) who manage specific cells or organisation units. These are persons who lead organisation units (teams), ensuring achievement of assigned tasks employing their subordinates to this objective [Listwan 2005, p.56]. Corporate output is defined as the result shown in financial statements according to the biding accountancy act and to provisions of part 5 of this act (Journal of Laws of 1994 no. 121, item 591, later amended) and art. 3 sections 12 20, 30, 31, introducing the definition of basic economic terms to be included in financial statements.

3.2. Description of the research method

In a study of management competencies one may apply idiographic, nomothetic or hybrid (complex) research approach [cf. Chełpa 2003, p. 66]. According to W. Windelband the idiographic approach may be used in recognising individual and unique phenomena, aimed at determination and description of single and individual facts, which are more specific. They are used when it is assumed that the research subject can't be easily generalised, as they are of individual nature and aim at identification of individual difference of the studied object, its unique and exceptional features. Nomothetic approach is focused on recurrent phenomena, and therefore on determination and description of general rules, similarities, universal principles which govern the studied phenomena [quoted from: Paszkiewicz 1983; Tatarkiewicz 1990; Chełpa 2003].

Both the idiographic and nomothetic approaches have their drawbacks, which are listed in detail by S. Chełpa [Chełpa 2003, p. 66-73]. The most important drawbacks of the idiographic approach include: little research training and low level of the researcher's expertise in obtaining data, arbitrary assessment of the data, the researcher's, more or less conscious, "private" concepts of measurement or skills of a perfect manager, which modify the process of

data collection and interpretation [Chełpa 2003, p. 69]. The most important risks of reliability of data obtained in nomothetic research of management staff involve eclectic selection of variables which may potentially affect the studied phenomenon, visible as thoughtless application of different theoretic options related to different areas of science, their combination without redefining the basic terms, while such redefinition is sometimes necessary [Chełpa 2003, p. 73]. As K. Perechuda and S. Sterc mentioned, generalisations defined in nomothetic research "cannot always be in conformity with each and every case in reality" [1982, p. 43]. Considering the "probabilistic" nature of such phenomena, the research considers especially tendencies, trends, resultants, disregarding particular, individual cases which question the correlation data. According to W. Windelband both methodology approach may be applied to the same subject [quoted from: Paszkiewicz 1983; Tatarkiewicz 1990; Chełpa 2003]. Thus, the complex approach is used, combining both discussed concepts [Gerstmann 1987]. With this approach, an individual research problem is solved by different, sometimes even opposing principles of the research process [Shively 2001]. Observation of the discourse in the scientific reports concerning which of the approaches is correct and grounded, doesn't provide a final solution. This is undoubtedly due also to the fact that a human being as a research object is characterised by several specific features, as noted by many scholars [Szałkowski 1997; Ossowski 1983, Watkins 2001; Sobczyk 2001]. According to A. Szałkowski, "in the social reality, study results, as well as the applied research methods have a significant effect on the further course of the studied phenomena or processes. The mentioned peculiarity is especially important in relation to generalisations (...). Contrary to the world of nature, where the discovered rules work always the same in unchanged circumstances, in the social life any defined rule or developed theory have their explanatory power limited in time and space" [Szałkowski 1997, p. 27].

Considering the described possibilities and difficulties, nomothetic approach to research of management competencies was selected. This allowed for application of statistical methods of inferring features of the studied objects. It also enabled replication of the study in future and verification of results obtained and conclusions drawn. It required definition of spaces of variables to be considered in the research and their effect on the studied

phenomenon, as well as operationalization of these variable, that is, their translation to behavioural indicators and quantitative language (encoding by numbers). From among research procedures used in nomothetic approach, lustration and correlation procedures were applied. The lustration procedure is focused on identification and description of the condition of the studied phenomenon in its natural environment. Therefore the study was done in the workplace of the management staff. The applied research method was self-observation questionnaire and the research technique self-assessment questionnaire. The methods were thus subjective. The applied correlation procedure was focused on identification of correlations between the components of the structure of management competencies of management staff and rating lists as well as knowledge-based economy/ organisation. The data were obtained based on the management staff's description of themselves. In planning the search for key competencies of management staff in knowledge-based economy and their correlation with corporate results, it was resolved to study selected groups: management staff of enterprises listed in ratings, which are knowledge-based organisations and management staff of enterprises outside ratings which are not knowledge-based organisations. The main subject of the research involved therefore management staff's competencies in the knowledge-based economy, while the research concerned the management staff themselves.

In order to verify the hypotheses, I have held a qualitative-quantitative research proceeding with application of a questionnaire (Appendix 1). This proceeding was based on triangulation (complementarity) principle of observing reality from different perspectives, comparison and confrontation of the obtained data to allow comprehensive understanding of the studied reality [Konecki 2000b]. Application of both qualitative and quantitative tools in the discussed study required integration of the measurement data by its preparation for statistical analyses. The questionnaire was developed for the purpose of the discussed study and its development was preceded by pilot research. The questionnaire included two parts and respondent's particulars. The questions in the first part served to determine whether the enterprise managed by the respondent is a knowledge-based organisation (it operates within the knowledge-based economy).

The second part concerned collection of the respondents' opinions on competencies which they found crucial for management in the knowledge-based economy. The questionnaire was structured so as to allow the respondents to select key competencies from the provided list or indicate their own suggestions. Intensity of the studied competencies was measured and quantified by a measurement scale with 1 – as intensity of no relevance (irrelevant); 2 – little relevance; 3 – medium; 4 – big; 5 – very big relevance. The respondent management staff was also asked to indicate which of those crucial competencies are their personal strengths, with the following scale: 1 – very weak; 2 – weak; 3 – medium; 4 – strong; 5 – very strong. Considering that the studied features were analysed as quantitative variables, the number the scale grew proportionally to intensity of the feature.

Of course, it must be considered that subsequent rates concerning relevance assigned (1-5) and assessment of strengths (1-5) describe only the sequence of the measurements and not the difference between them. This allowed for comparison of the values and statement whether they are bigger or smaller than others. The research focused on both relevance and strength of competencies because it was possible that a respondent would find a competency crucial for the knowledge-based economy, but not as their personal strength. On the other hand, according to the defined objectives of the study the management staff's competency gap was to be defined. This distinction was applied also because in the process of staff selection by analysing the employees' opinions on the issues, one can conclude that if an employee found a competency relevant, then it was more probable that the enterprise managed by this person was a knowledge-based organisation and was listed in ratings. The measurement procedure for the dependent variable was identical for all the respondents to ensure comparability of data obtained for both groups. The independent variable was a bivalent nominal variable (enterprise listed in rankings which was a knowledge-based organisation; enterprise outside rankings which was not a knowledge-based organisation) and the dependent variable (competencies) was a numerical variable. The research confirmed that both variables: the independent variable (knowledge-based enterprise listed in rankings; non-knowledge-based enterprise outside rankings) and dependent variable (competencies) are significantly correlated. In the research, qualitative variables were analysed, too. The measurement was based on different measurement scales, e.g. nominal scale applied for measuring qualitative features. Variables were listed on the nominal scale when they had a value (label) for which there is no order arising from the character of the phenomenon. One should remember that even if the value of a nominal variable is expressed by numbers, those numbers are only conventional identifications which cannot be applied in mathematical operations or comparisons. Grounded theories methodology was used to build theories based on empirical data [Glaser, Strauss 1967, p. 1-2; Glaser 1978, p. 2]. The following nominal variables were used: management level, gender, knowledge reliance, rating. The measurement of variables was expressed by classification (labelling / denomination) to allow for classification of the objects (management staff).

It was assumed that identification of key management competencies shall be done by self-assessment. This method was selected basically because of the possibilities to hold the study within the planned implementation of a research project funded by the European Union. Further, management staff is unwilling to be observed or tested. However, if you treat selfdescription study in purely quantitative way, then there have been much more of them than of studies based on assessment by an observer. Researchers argue that probably the most significant contribution of studies based on external assessment was evidence that self-description may be correct, too [McCrae, Costa 2005, p. 59]. Usefulness of self-assessment in the process of feature identification is indicated by many authors. R.B. Cattell [1957] argues that features' markers are behaviours which may be observed, tested or which may be self-described by respondents asked by researchers. Their research provided positive verification of the hypothesis that independent studies on personality based on self-observation (self-assessment) data and observation data describe the same structure of traits of the respondent, because the analysed object is the same. Similarly, R.R. McCrae and P.T. Costa [1999 2008] in their five-factor personality theory indicate a presumption on human nature, showing that it is significantly prone to self-cognition, which means that a man usually knows their own traits. This position is shared by P.F. Drucker, who stresses that "in their professional ac-

tivity the employee can and should recognise their strong points and undertake the tasks where their skills and predispositions may be best employed" [Drucker 1995, p. 173, quoted from: Moczydłowska 2008, p. 3]. Of course, reliability and diligence of the provided answers should be considered, too. The author assumed that there is a lesser risk related to lack of motivation to answer carefully, because the respondents were not anonymous and they were aware that their answers would be analysed. In some cases, however, there could have been some more or less conscious attempts by the respondents to improve their image (overestimation of their strength). However, it should be noted that the Polish management staff tends to underestimate their strengths, contrary to management staff of other nationalities, e.g. the Americans. Similarly, women's self-assessment is lower than men's. Despite those practical limitations, it seems that self-assessment may be a valuable and reliable source of information.

The research and data collection were performed by way of meetings with entrepreneurs, using Edito software by IDEO and internet. Respondents were asked to fill in a printed or online questionnaire recorded in a system that made the data available for further statistical and analytical processing by Excel spreadsheets. During implementation of the research, the following difficulties were observed:

- 1. Enquirers reported serious difficulties in reaching respondents. Management staff mentioned lack of time and was not willing to participate in the research. Top managers often changed agreed appointments with enquirers.
- 2. Sixty percent of the visited respondents refused to fill in the questionnaires because of "corporate policies" and because of big accumulation of questionnaire studies at the market at the same time.
- 3. Presidents of big and medium enterprises and their middle management staff worried that their personal data wouldn't be protected properly within the research.
- 4. Another difficulty in implementation of the research concerned holidays. Because of other difficulties, the research extended into holidays, when many directors, presidents of management boards were on holidays or were difficult to find in offices despite many attempts to make an appointment.

Considering the main goal of the research, which concerned identification of key competencies of management staff in the knowledge-based economy, eventually a comparison of two groups of respondents was chosen: management staff of enterprises listed in rankings which were knowledge-based organisations (operating in the knowledge-based economy) and management staff of enterprises outside rankings which were not knowledge-based organisations. Verification of whether an enterprise was a knowledge-based organisation involved cross-verification in the case of more than one representative of the enterprise whether the organisation was always classified as a knowledge-based organisation only if all employees found it so.

The results obtained were used by the author as a starting point to develop a "Model of key competencies of management staff in the knowledge-based economy and their correlation with results of enterprises listed in rakings" (see Fig. 6.1). Its elements are based on the statistically significant correlations identified in the empirical research between key competencies of management staff and results of knowledge-based enterprises listed in rankings.

The author adopted the induction method, which meant that the developed model was a conclusion of generalisations of data from the empirical research. Correctness of this method is indicated by P.T. Costa and R.R. McCrea [1992], who argue that defining a model based on generalisations of empirical data is entirely grounded and correct. A parametric-binomial test was used. Considering that the studied groups included a various number of respondents (e.g. women and men), non-parametric tests were used (chisquare test of independence, Cochran-Armitage test and Fisher test). These are groups of statistical methods which serve to test hypotheses without requiring knowledge of parameters of distribution of studied traits in the population. Calculation procedures did not take this data into account. The held empirical research analysed traits by measuring their intensity in the studied objects. Measurement was defined as counting how many elements (management staff) of the given collection (knowledge-based enterprises listed in rankings; and non-knowledge-based enterprises outside rankings) had the trait in question. A variable is met when the trait in ques-

tion cannot be attributed in the same way to all analysed objects. Value of the variable was treated as intensity of the trait. In the research, if a trait had at least two values, then we may define it as a variable. Remembering that in the first stage of the research the trait (competency) had values from 1 to 5, the measurement was made by a nominal scale which consisted in classification of the respondents collections into predefined, complete and disjunctive qualitative categories. The division applied in the research was exhausting (binary or dichotomous) which means that each element could be assigned unequivocally into one group only. Qualitative variables were disjunctive, meaning that each element (representative of management staff) was unequivocally assigned to just one group. Therefore, according to a nominal scale, the respondents were classified as follows:

- management staff of knowledge-based enterprises listed in rankings vs. management staff of non-knowledge-based enterprises outside ranking;
- female and male management staff (men and women)
- lower and higher level management staff.

It should be borne in mind that measurement by a nominal scale allows only to state that both objects (representatives of the studied management staff) in different categories are different with respect to the measured trait. It was impossible to define the relationship between the objects with such expressions as "bigger than...", "equal to..." or "lower than...". The variable (competencies) was measured also by ordinal scale (or rank scale) which allowed for putting them in a sequence of intensity of the trait. Rank scale enabled also determination of relationships of "majority" and "minority" between the studied objects (representatives of management staff) which held the trait in question in a different or the same degree (if the objects are identical with respect to the trait in question). An example of an ordinal scale is the skills to take decision rapidly. Thus, whether a person is genetically a woman or man, is defining a value in a nominal scale. Trait measurement (e.g. openness to experience) can be more characteristic for a representative of management staff of knowledge-based enterprises listed in rankings than a representative of management staff of non-knowledgebased enterprises outside rankings.

It should be remembered also that between values of a trait set in an ordinal scale (e.g. openness to experience) there are two logical relationships: cohesion and transitive relation [Francuz, Mackiewicz 2005, p. 31]. This fact was applied in the discussed study.

The cohesive relation occurred when two measurements x and y were different from each other, either x was larger than y or else x was smaller than y. In other words, if a respondent found that the competency of openness to experience was their strength in a different degree than the competency of diligence, it means that openness is their strength to a larger extent than diligence or on the contrary, diligence is their strength to a larger extent.

Further, if there is a transitive relation between measurements of competencies which are the respondent's strengths, e.g. diligence, specialist knowledge and ability to ensure high quality of work, it means that diligence is the respondent's stronger skill than specialist knowledge and specialist knowledge is their stronger part than the ability to ensure high quality of work. Key competencies in the knowledge-based economy were measured by an ordinal scale (rank scale).

The research focused on finding permanent relations between different traits of respondent objects (management staff competencies vs. knowledge-based organisation/economy and rankings).

In the case of analysis of differences between key competencies of management staff of knowledge-based enterprises listed in rankings and management staff of non-knowledge-based enterprises outside rankings, the respondents' gender and management level (lower/higher) were considered as a constant with competencies as a variable.

The data was processed with methods of statistical data analysis. In relevance analysis binary test was used. Considering that the variable could assume more than two values (1, 2, 3, 4, 5), it was classified and only those competencies were analysed which had been declared by the respondents as important or very important (with the value of 4 or 5). For other cases the value of 0 was taken. This approach allowed for categorisation of competencies as the most important ones, less important ones and irrelevant ones. Trend analysis within contingency table was done by Cochran-Armitage test, while for calculation of strength of the correlations, tetrachoric correlation concept was applied.

The author attempted to calculate correlations to indicate strength of the relationship between the analysed traits as expressed as an absolute value of the correlation coefficient. The objective of the correlation analysis was to find relationships of covariance of two or more quantitative variables. It should be borne in mind that the foundation of correlation research involves determination whether an increase of the value of one variable (e.g. management staff competencies) brings an increase or reduction of another variable (corporate results, basing on knowledge). It is also worth mentioning that regardless of whether the answer is positive or negative, correlation research results must not be interpreted as causative relations [Francuz, Mackiewicz 2005, p. 471].

The research involved identification of significance of difference in answers provided between respondents:

- from knowledge-based enterprises listed in rankings vs. non-knowledge-based enterprises outside rankings,
- of different sex (women vs. men),
- at different management positions (medium management vs. top management).

For each variable a code was included to facilitate identification of questions in the questionnaire (Appendix 1). For instance: *p.2.psy.1.*z means question (*p*) no. two (*2*) for psychological traits (*psy*) and answer for the variable no. (*I*) which corresponds to significance of competencies (*z*). If it concerns strength of the competency, then there will be an (*s*) instead of (*z*). The analysis concerned questions (further referred to as "Group A"): considering variables (called "Group B"): sex (two levels: woman, man), management level (two levels: lower level management staff, top level management staff), corporate results and application of knowledge in the enterprise (two levels: knowledge-based enterprises listed in rankings and non-knowledge-based enterprises outside rankings). Statistical data analysis method was applied to verify:

- significance of differences in answers provided (Group A) by respondents in different categories of variables in Group B,
- occurrence of a tendency (trend) of assigning larger significance as more probable for particular groups, e.g. women than men

or management staff of knowledge-based enterprises listed in rankings than non-knowledge-based enterprises outside rankings etc.,

strength of relationship between Group A and Group B (excluding sex).

WIn research of difference significance, a binary test was applied. One of the considered variables in Group B concerned the position held - positions were classified so as to obtain a binary variable. Thus, higher and lower level of management were defined. In the same group, similar categorisation was used for the variable concerning degree of the enterprise's knowledge-based status. If the respondent declared "yes", the variable was assigned a "1" and in the other cases – "0". The variables in Group A were binary variables, too. If the question allowed for more than two values of the answer, it was categorised as follows: if the answer was 4 or 5 in a 5-degree scale, then the value assigned was "1", otherwise, the value assigned was "0". This approach enabled separation of really important factors from those which were less important or irrelevant. When verifying the hypothesis of equality of structure indicators, p-value was calculated, too. If the significance level of the test (defined in this study as 0.1) was larger than or equal to p-value, then the null hypothesis was rejected – stating therefore for instance that differences concerning answers provided are significant. Further, confidentiality intervals were defined for differences of proportions. They allow for greater potential of interpretation than a numerical score, because they show the probability (in this study: 0.9) the interval includes the estimated difference. Trends in contingency table were analysed by the Cochran-Armitage test [Agresti 2002; Liu, Berger, Hershberger 2005] while in calculation of strength of relationship tetrachoric correlation was applied [Harris 2006; Drasgow 2006; Olsson 1979]. Chi-square test of independence and Fisher test were performed, too. It seems grounded to describe these methods in detail and explain why they were selected.

Cochran-Armitage test

The binary test allows for determination whether differences in proportions for two groups of positions are statistically significant. However, nothing can

be said about tendencies (trends) within the provided answers. It is especially interesting considering the research objective to ask: if a respondent finds a competency more relevant, does the probability increase that the respondent is top management representative or woman or their enterprise is a knowledge-based organisation listed in rankings? Such a hypothesis may be verified using the Cochran-Armitage test, as it is shown below [Agresti 2002; Liu, Berger, Hershberger 2005]. In this test, a two-dimension contingency matrix is developed where binary variable is a variable of Group B, while the ordinal variable is a variable of Group A. For such a developed $I \times 2$ matrix binary y_i variable is assumed to be parameter-indexed (n_i, π_i) . With such assumptions, in the trend analysis one starts with a linear probability model:

$$\pi_i = \alpha + \beta x_i$$

with x_i representing the result (level) of the ordinal variable, while the model parameters are estimated by the method of least squares.

Considering Pearson statistics in independence verification for the $I \times 2$ matrix and assuming p_i

$$\chi^2(I) = z^2 + \chi^2(K),$$

where:

$$\chi^{2}(K) = [p(1-p)]^{-1} \sum_{i=1}^{I} n_{i} (p_{i} - \hat{\pi}_{i})^{2}$$
$$z^{2} = \frac{\hat{\beta}^{2}}{p(1-p)} \sum_{i=1}^{I} n_{i} (x_{i} - \overline{x}_{i})^{2}.$$

If null hypothesis is true, z^2 statistics has a chi-square distribution with 1st degree of freedom and it is called Cochran-Armitage statistics.

Considering the fact that ordinal variables may have five values (1-5) and that they were aggregated within the analysis – to make the obtained results even more reliable, two cases were analysed. Firstly, the ordinal variable was aggregated to three levels with 1 and 2 as the first category, 3 as the second category and 4, 5 as the third category. Secondly – ordinal variables were used at their original value. In calculations, apart from the test statistics value, p-value was given, too; test significance level was defined at 0.1.

Polichoric and tetrachoric correlation

The next stage of the analysis involved calculation of strength of the relationship between assessment of variables in Group A and variables in Group B (excluding sex). Considering that we were concerned with a correlation between binary variables (aggregated answers to questions in Group A), relevant tools should be applied. In the questionnaire, respondent was asked to define significance and degree (group A) with a five-grade scale. As a result, this is an ordinal variable. The measurement tools are not perfect, so – even though such a trait could be considered as a continuum – practically it can be registered as a scale of a limited number of categories (usually 5 or 7). Additionally, there is a problem related to the unnatural obliqueness of the distribution where the modal value is focused around the large influence of a competency. The obliqueness results from narrowing of the measurement scale to a lower number of categories – very few respondents believe that any competencies have small or no influence. To manage this latter inconvenience, it seems effective to aggregate the variables into a binary variable. However, this makes it even more difficult to treat such a variable as a continuum (and therefore this is a nominal variable), resulting in narrowing of the group of potential data analysis techniques. If we want to verify strength of relationship between binary variables, relevant coefficients for contingency matrix may be applied, however they do not provide such interpretation field as Pearson correlation coefficients for continuum.

If variables can be treated as continua but answers can hardly be registered on a continuous scale, then the concept of polichronic or tetrachornic correlation can be applied. The idea involves treating such variables as hidden continua which cannot be observed directly. With this starting point, Pearson correlation coefficient may be calculated. It should be noted here that the hierarchy of positions can be treated as a continuum with ending points of lower level and higher level. It is worth noting that the category "manager" does not have to mean the same level in the hierarchy. Maybe a manager of a small enterprise should be treated as a lower level in the hierarchy than a manager in a big corporation. Therefore the position variable was treated as a hidden continuum. Similarly, the researcher treated

the variable concerning listing in rankings and knowledge-based organisations as hidden variables. Therefore, tetrachoric correlation between binary variables was checked. Technical details, corresponding to the published literature [Harris 2006; Drasgo 2006; Olsson 1979] are described below.

With X and Y as continuous, hidden random variables of standardised, two-dimension normal distribution of density function $\phi(x,y,\rho)$ with ρ . correlation coefficient, there are discreet, observable variables of A and B, related to them with number of categories (levels) k and r respectively. Then:

$$\begin{split} A &= a_i \quad \text{gdy} \quad \alpha_{i-1} \leq X < \alpha_i, \qquad i = 1, 2, \mathsf{K} \ , k \\ B &= b_j \quad \text{gdy} \quad \beta_{j-1} \leq Y < \beta_j, \qquad j = 1, 2, \mathsf{K} \ , r \end{split},$$

with α and β as threshold value which categorise the hidden variables and meet the following conditions:

$$\begin{aligned} \alpha_0 < \alpha_1 < \mathbf{K} &< \alpha_k, \\ \beta_0 < \beta_1 < \mathbf{K} &< \beta_r, \\ \alpha_0 = \beta_0 = -\infty, & \alpha_k = \beta_r = \infty. \end{aligned}$$

With these assumptions, the correlation coefficient in question is analysed, as well as threshold values using a method of biggest reliability. It is based on the following probability:

$$P(A = a_i, B = b_j) = \int_{\alpha_{i-1}}^{\alpha_i} \int_{\beta_{i-1}}^{\beta_j} \phi(x, y; \rho) dy dx.$$

Thus calculated correlation coefficient is called polychoric correlation. If we limit the number of levels for both variables to two, then this is a tetrachoric correlation.

3.3. Selection and characteristics of the research population

In the research, the quota selection was applied, which forced resignation of statistic condition of representativeness of the research. This selection method was chosen not only considering the research objective, but above all in relation to

research possibilities. In the case of quota selection criteria are indicated which define significant differences in the population concerning the object of the research [Lohr 1999; Rao 2000]. This method was applied because the sample selected reflects the structure of the population considering the features in question to a large extend and further individuals within a group (layer) are characterised by greater uniformity. Holding a representative research for the entire population of the Lower Silesian management staff would require random selection of research sample. However, this would make the research much more difficult and longer and, as mentioned above, the timeline was limited in the research project. With random selection organisational issues and necessity to obtain consent from respondents would have become the main problem. The latter factor, especially, may change the random character of an analysed sample. Another important difficulty involved the fact that there are significantly fewer women than men at management position, especially in the top management. This situation justified a targeted selection. As stressed by Z. Rusnak, "if a sample is too small compared to the general population, then it is safer to select targeted objects for the sample" [Rusnak 1999, p. 306]. According to M. Hammersley and P. Atkinson, targeted selection reduces the number of analysed cases and minimises differences between them, thus allowing for exposition and better development of phenomena or processes which are studied [Hammersley, Atkinson 2000]. An arbitrary [non-random] selection of respondents for a research allows the researcher to select such members of the population who are the most probable to provide reliable information [Kotler 2005, p. 136-137; Kotler et al. 2002, p. 376]. Resignation of broad generalisations of the results does not necessarily reduce their cognitive value [Chełpa 2003, p. 151] and, as evidenced by published research results, many authors use targeted selection of the research sample [cf. Nogalski 1986; Witkowski 1995; Stolarska 1998; Błaszczyk 1999; Szaban 2000; Morawski 2009].

The studied population was therefore divided into groups by predefined criteria and selection was done in a targeted way. Enterprises and respondents for the study were selected according to the following criteria:

- sex of the manager (woman, man),
- level of management position (lower, higher),
- size of the enterprise (micro, small and medium, big),

 results achieved (enterprises listed in rankings of the best enterprises and outside rankings),

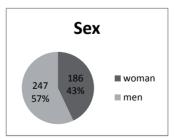
- application of knowledge (knowledge-based organisation, non-knowledge-based organisations),
- location of the enterprise in Lower Silesia (NUTS 3 region).

Determination of the percentage of particular groups was based on their actual distribution in the population (by employment according to data by the Chief Statistical Office of 2007). The only exception used in the research concerned the number of women who held management positions significantly less frequently than men. From the point of view of research objectives, the author resolved that effort should be taken to analyse their opinion in a number similar to the number of men.

The research covered a total of 433 (N) persons holding management positions at lower and higher levels, including 247 men and 186 women.

The dominant group among the respondents were persons aged from 30 to 49 (62.8%). There were 22.9% of persons aged 25-29. The smallest group (14.3%) included persons aged 50-65 (Fig. 3.1).

A significant majority of managers included in the study (75.3%) held a university degree. The largest group was that of top management (61%), including presidents of management boards, members of management boards, directors, deputy directors, owners, co-owners. From among the top management staff owners and co-owners of enterprises were separated, too (39.5%). The lower-level management staff (39%) included persons employed as: manager, team leader, shift leader, foreman (Fig. 3.2).



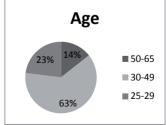


Fig. 3.1. Sex and age of the respondents (N = 433) Source: original research (personal data form – Appendix 1, questionnaire).

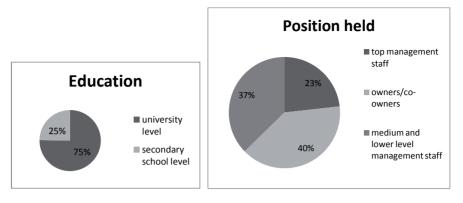
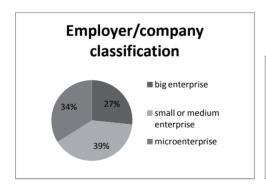


Fig. 3.2. Education and position held among the respondents – detailed data (N = 433) Source: originally developed based on research results (personal data form – Appendix 1, questionnaire).

Management staff of 339 Lower Silesian enterprises took part in the study: Thirty four percent of them were micro-enterprises, 40% - small and medium enterprises and 26% - big enterprises (Fig. 3.3). Twenty one percent of the enterprises indicated presence of foreign capital within the corporate funds. A maximal number of three respondents from one enterprise was determined.



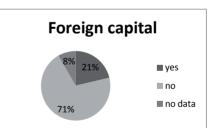


Fig. 3.3. Classification of enterprises and foreign capital (N = 433 enterprises) Source: original research (personal data form – Appendix 1, questionnaire).

One of the main inclusion criteria in the study was location in Lower Silesia. Fifty-two percent of the enterprises operated in the city of Wrocław, 12% - in the poviat of Jelenia Góra, 11% - in Legnica-Głogów poviat, 17% - in the poviat of Wałbrzych and 7% in the poviat of Wrocław.

In the present study enterprises were defined as business entities regardless of their legal form: individuals who conduct business operations, family enterprises specialising in crafts or other business, as well as companies or consortia which operated regularly. The category of micro-enterprises, small and medium enterprises (SME) included those enterprises which employed fewer than 250 employees, had a yearly turnover of no more than 50 million euro and/or total yearly balance of more than 43 million euro. Within the SME category a small enterprise was defined as an enterprise which employed fewer than 50 employees, had a yearly turnover and/or total yearly balance of no more than 10 million euro. Within the SME category a microenterprise was defined as a firm which employed fewer than 10 employees and had yearly turnover and/or total yearly balance of no more than 2 million euro⁴¹. The study included enterprises which had a branch or sales office in Lower Silesia, provided that the respondent was an employee of this branch or office.

Enterprises in the research were selected from two databases prepared specifically for the study. One database included 530 enterprises from Lower Silesia which were in rankings (the List of 2000 by the daily *Rzeczpospolita* 2008, Gazele Biznesu ranking 2008, Ranking of Lower Silesian Enterprises 2008, List of 500 by the daily *Rzeczpospolita* 2009).

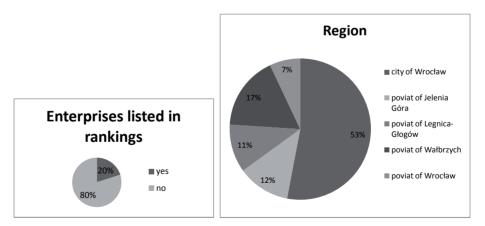


Fig. 3.4. Classification of enterprises by their results (rankings and out of rankings) and location (N = 433 enterprises)

Source: original research (personal data form – Appendix 1, questionnaire).

⁴¹ On the 6th May 2003, the Commission accepted a new recommendation to define SMEs. It came to force on the 1st January 2005, www.parp.gov.pl/files/74/87/qq55.pdf [accessed: 30.05.2009].

The second group included enterprises from outside the rankings selected from among 3,000 companies (the data of these companies were purchased from the Chief Statistical Office). The selection was based on recommendations from associations of enterprises, management staff, scientists and lecturers and on consents to participate in the study granted by enterprises.

Finally 20% of the studied enterprises were those listed in rankings, i.e. there were 68 of them, and 80% were enterprises outside rankings, i.e. 271 (Fig. 3.4).

It was assumed that if an enterprise was listed in any ranking, it meant that the enterprise had achieved better results than enterprises outside rankings. When selecting enterprises for the research sample, it was verified whether the firm had achieved a positive financial result in the previous three years.

In the study there were respondents from the following rankings:

- the List of 2000 by *Rzeczpospolita* daily 2008 30 enterprises;
- the List of 500 by *Rzeczpospolita* daily 2009 18 enterprises;
- Ranking of Lower Silesian Enterprises 2008 12 enterprises;
- Gazele Biznesu ranking 2008 8 enterprises.

Organisers of the analysed ranking lists assessed enterprises according the criteria which are described below. The criteria were not uniform, but enterprises were always evaluated according to the binding act on accounting (chapter 5 of the Act on Accounting (Journal of Laws of 1994 no. 121, item 591, later amended) and art. 3 section 1 points 12 20, 30, 31, which introduce the basic economic expressions used in financial statements. The criteria applied in the ranking lists were as follows:

List of 2000 by Rzeczpospolita daily 2008

The ranking published by the daily Rzeczpospolita was developed based on financial statements (unit and consolidated statements), questionnaire data and information such as contact details, ownership data, export and employment for 3,700 enterprises which achieved at least 65 million of revenues in 2007. In preparation of the list, such indicators were used as: dynamics of sales revenues (%) in 2007 as compared to 2006; net financial result (thousand PLN) (for capital groups: a sum of net results attributed to the dominant entity and net result of minority shareholders); assets (as on 31.12.2007); corporate

capital (as on 31.12.2007); investments (purchase of legal and intangible assets and tangible fixed assets); employment (average employment in 2007). All reports presented by enterprises had been verified by expert auditors (List of 2000, Rzeczpospolita, 31.10-02.11.2008, p. 54).

List of 500 by Rzeczpospolita daily 2009

The ranking published by the daily *Rzeczpospolita* was prepared based on complete statements of financial results provided by enterprises to the editorial office. The ranking included those enterprises which had positive corporate capital, net profit in 2007 and 2006. The selection excluded enterprises which held monopolies in their industries. In preparation of the list, efficiency indicators were analysed: return on equity, net returns, EBIDTA margin⁴², dynamics of revenues per one person employed, return on corporate funds and assets, stability and development potential, i.e. increase of revenues, intensity of investments. Other factors considered included share of export in sales and level of expenses on investment (List of 500, *Rzeczpospolita*, 29.04.2009, p. 6).

Ranking of Lower Silesian Enterprises 2008

This ranking was published by *Gazeta Wrocławska*. It considered such indicators as: revenues on sales in 2008, net profit and level of investment expenses in the same year and employment.

Gazele Biznesu ranking 2008

The ranking, published by *Puls Biznesu*, was developed by Coface Poland Group. It appreciates dynamically developing Polish enterprises with stable increase in revenues which are reliable and diligent business partners for their customers. An enterprise's rating on the list depended on the increase of turnover (percent) achieved in three subsequent years. Enterprises classified in the ranking had been publishing their financial results in *Monitor Polski B* since 2005 or had made the data on financial results available to Coface Poland or *Puls Biznesu*.

⁴² Earnings Before Interest, Taxes, Depreciation and Amortisation.

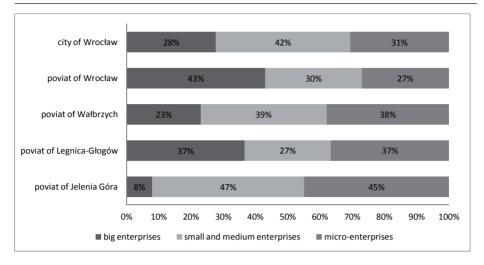


Fig. 3.5. Classification of enterprises by their location and size (N = 433 enterprises) Source: original research (personal data form – Appendix 1, questionnaire).

The ranking did not include enterprises which offered financial services, such as banks, insurance companies or factoring companies. It did not take into account results of capital groups. Enterprises classified for the ranking were extinguished by their perfect image and honesty towards contractors, employees and the state.

The detailed classification of respondent enterprises by location and size is shown in Figure 3.5.

The enterprises where the research was held were divided into three groups considering intensity of application knowledge in their business. This selection was made in order to collect information from management staff of variable enterprises to allow for identification of universal competencies and those specific for knowledge-based enterprises. The 1st group (25% of the study group) included enterprises which applied knowledge intensely, conducted business concerning information and communication, financial and insurance services, services related to real estate market, professional, scientific and technical business, education, healthcare and social assistance. In the 2nd group (67% of the study group) there were enterprises which applied knowledge on a medium level, specialising in such areas as: industrial processing, coal and other mining, production and supply of elec-

tric energy, gas, steam, hot water and air for air conditioning, water supply, waste and sewage management and recultivation, construction industry, wholesale and retail, repair of mechanical vehicles including motorcycles, transport and warehousing, services related to administration and support, public administration and national defence, compulsory social insurance, other services. The 3rd group (8% of the study group) consisted of enterprises which applied knowledge to a small extent; their business was related to agriculture, forestry, hunting and fishing, accommodation and catering, culture, entertainment and recreation, households with employed staff, households producing and rendering services for their own needs, exterritorial organisations and complexes.

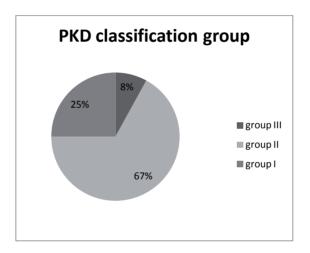


Fig. 3.6. Classification of enterprises by PKD and knowledge application (N = 433 enterprises)

Source: original research (personal data form – Appendix 1, questionnaire).

The research sample is characterised according to sex, management level and corporate results in Table 3.1.

The search for key competencies of management staff in the knowledge-based economy and their correlations with corporate results required a study of specifically selected groups. The first one included management staff of knowledge-based enterprises listed in rankings (79 persons, including 52 men

and 27 women) and management staff of non-knowledge-based enterprises outside ranking lists (241 persons, including 171 men and 70 women).

Table 3.1. Number of respondents in the studied groups considering sex, level of management and corporate results (N = 433)

Sex	Management level	Corporate results	Quantity (N)
	Lower level management	Enterprise outside rankings	52
Female	staff (medium and low)	Enterprise listed in rankings	27
		Enterprise outside rankings	81
	staff	Enterprise listed in rankings	26
	Lower level management	Enterprise outside rankings	58
Male	staff (medium and low)	Enterprise listed in rankings	22
Male	Top level management	Enterprise outside rankings	137
	staff	Enterprise listed in rankings	30

Source: original research.

The details of the research sample, considering sex and presence in rankings/knowledge application are shown in Table 3.2.

Table 3.2. Number of respondents in the studied groups considering sex, level of management and corporate results (N = 433) - details

	Respor	Respondents in non-knowledge-based enterprises outside rankings	1-knowle tside ran	dge-based kings	Res	Respondents in knowledge-based enterprises listed in rankings	knowled ted in ra	ge-based nkings
Management Staff Competency	W	women		men	<i>></i>	women		men
	Num- ber (N)	N percentage in the line	Num- ber (N)	N percentage in the line	Num- ber (N)	N percentage in the line	Num- ber (N)	N percentage in the line
Openness to experience (Z)	55	%92	80	75%	18	82%	26	%06
Openness to experience (S)	50	%69	89	%59	20	%28	25	%98
Emotional stability (Z)	52	72%	74	%02	18	82%	24	83%
Emotional stability (S)	45	63%	57	25%	19	83%	23	%62
Extraversion (Z)	45	93%	64	%19	17	%18	21	72%
Extraversion (S)	44	62%	55	23%	18	%78	18	62%
Amicability (Z)	37	52%	54	52%	14	64%	16	25%
Amicability (S)	39	25%	25	20%	15	%59	21	72%
Diligence (Z)	57	%62	84	%62	20	%16	26	%06
Diligence (S)	52	72%	69	%99	20	87%	24	83%
Low reactivity (Z)	46	%99	69	%19	16	73%	25	%98
Low reactivity (S)	37	54%	46	45%	14	61%	22	%92
Rapid reaction (Z)	53	74%	<i>L</i> 9	64%	17	77%	25	%98
Rapid reaction (S)	43	%09	53	20%	14	61%	24	83%
Activity (Z)	40	58%	69	%99	18	82%	22	%92
Activity (S)	40	58%	99	54%	16	%02	20	%69
Focus on principles (Z)	28	39%	47	47%	12	57%	10	36%
Focus on principles (S)	30	42%	41	41%	15	%89	16	57%
Intellect / intelligence (Z)	59	84%	06	87%	22	100%	27	93%
Intellect / intelligence (S)	53	77%	73	%02	17	74%	28	%26

Rivalry skills (Z)	41	%65	29	64%	15	%89	17	%65
Rivalry skills (S)	30	42%	57	%95	11	48%	16	25%
Degree of emotional intelligence (Z)	50	%02	75	71%	16	73%	22	%92
Degree of emotional intelligence (S)	47	%99	09	%65	18	78%	24	83%
Entrepreneurship (Z)	62	87%	91	%98	19	%98	25	%98
Entrepreneurship (S)	49	%69	73	%02	19	83%	24	83%
Analytical skills (Z)	49	%89	74	71%	17	77%	25	%98
Analytical skills (S)	43	%09	09	%65	17	74%	25	%98
Individual approach (Z)	32	46%	51	46%	8	36%	13	45%
Individual approach (S)	28	40%	39	38%	12	52%	17	%65
Striving to perfection – maximalist attitude (Z)	41	28%	58	55%	13	%65	23	79%
Striving to perfection – maximalist attitude (S)	37	23%	48	47%	12	25%	21	72%
General knowledge (Z)	99	%6 <i>L</i>	02	%99	17	77%	25	%98
General knowledge (S)	53	75%	99	93%	19	%98	27	93%
Knowledge of economics (Z)	52	74%	74	%02	20	91%	28	%26
Knowledge of economics (S)	40	27%	44	43%	19	83%	23	79%
Knowledge of management (Z)	52	73%	71	%89	22	100%	25	%98
Knowledge of management (S)	45	%89	53	%05	18	82%	22	%92
Knowledge of psychology (Z)	41	28%	54	52%	16	73%	20	%69
Knowledge of psychology (S)	38	54%	44	43%	14	64%	16	92%
Knowledge and understanding of problems concerning the enterprise and its staff (Z)	46	%59	89	%59	17	77%	26	%06
Knowledge and understanding of problems concerning the enterprise and its staff (S)	40	%95	48	47%	18	82%	22	%9L
Knowledge of trends and forecasts affecting economy (Z)	53	74%	62	%09	16	73%	22	%92
Knowledge of trends and forecasts affecting economy (S)	35	49%	54	52%	17	77%	19	%99
Technical, specialist knowledge (Z)	99	78%	82	78%	17	77%	24	83%
Technical, specialist knowledge (S)	46	%59	70	%89	18	82%	24	83%

Skills to manage knowledge and knowledge staff (Z)	53	74%	81	%9L	20	%16	25	%98
Skills to manage knowledge and knowledge staff (S)	38	53%	52	20%	16	%02	22	%92
Skills to implement organisational culture of a learning, knowledge managing organisation (Z)	52	73%	64	%09	14	64%	25	%98
Skills to implement organisational culture of a learning, knowledge managing organisation (S)	40	%95	47	45%	13	%65	19	%99
Skills related to achievement of a competitive advantage at an international market (Z)	40	%95	29	64%	16	73%	19	%99
Skills related to achievement of a competitive advantage at an international market (S)	23	32%	40	39%	11	%05	14	48%
Management skills (Z)	53	77%	82	% <i>LL</i>	21	%56	26	%06
Management skills (S)	39	27%	63	%19	17	77%	25	%98
Forecasting skills (Z)	50	%69	70	%29	17	77%	25	%98
Forecasting skills (S)	34	47%	55	53%	12	55%	18	62%
Negotiating skills (Z)	52	%9/	79	75%	16	%9L	24	83%
Negotiating skills (S)	42	62%	19	%65	15	71%	21	72%
Skills to find education options for oneself and staff (Z)	48	%89	62	%09	13	%65	25	%98
Skills to find education options for oneself and staff (S)	39	55%	48	48%	11	48%	20	%69
Talent management skills (Z)	46	%99	77	73%	15	%89	25	%98
Talent management skills (S)	38	25%	62	%65	12	55%	21	72%
Ability to create a right workplace for employees (Z)	52	74%	92	72%	18	82%	26	%06
Ability to create a right workplace for employees (S)	39	%95	59	27%	15	%59	21	72%
Social skills (Z)	45	64%	72	%89	19	%98	24	83%
Social skills (S)	44	62%	59	%95	14	61%	23	%62
Ability to recognise important issues and prioritise them (Z)	50	71%	73	%0 <i>L</i>	19	%98	26	%06
Ability to recognise important issues and prioritise them (S)	46	%99	61	%09	15	%59	24	83%
Ability to communicate in a foreign language fluently (Z)	51	72%	92	72%	18	82%	25	%98
Ability to communicate in a foreign language fluently (S)	39	%95	54	52%	15	%89	24	83%

Marketing skills (Z)	53	75%	73	%02	20	91%	24	83%
Marketing skills (S)	39	54%	50	49%	15	%89	21	72%
Ability to ensure high quality of work (Z)	57	%62	75	71%	19	%98	25	%98
Ability to ensure high quality of work (S)	48	%19	99	63%	19	83%	20	%69
Customer-focus skills (Z)	59	82%	92	74%	19	%98	25	%98
Customer-focus skills (S)	48	%89	29	%99	18	82%	25	%98
Ability to set objectives and methods to achieve them (Z)	57	%08	75	72%	20	91%	27	93%
Ability to set objectives and methods to achieve them (S)	45	64%	51	20%	18	78%	21	72%
Ability to increase productivity (Z)	57	%6L	74	%02	19	%98	27	93%
Ability to increase productivity (S)	40	%95	54	52%	15	%89	22	%92
Ability to translate corporate objectives to individual employees' goals (Z)	48	%89	99	63%	16	76%	18	62%
Ability to translate corporate objectives to individual employees' goals (S)	37	52%	39	39%	13	%65	18	64%
Skills to apply information and communication technology and techniques (Z)	48	%89	99	63%	13	%65	23	82%
Skills to apply information and communication technology and techniques (S)	35	49%	51	%05	6	41%	19	%89
Ability to focus on intangible assets of the company (Z)	44	61%	55	52%	13	26%	21	75%
Ability to focus on intangible assets of the company (S)	34	48%	43	43%	11	61%	22	76%

Description: (Z) means relevance assigned by the respondent to the competency and (S) means the respondent's strength. Source: original research.

3.4. Are Lower Silesian enterprises knowledge-based organisations? Respondents' opinions

In order determine, which enterprises, if any, are knowledge-based organisations, empirical research of representatives of Lower Silesian enterprises was held (as described in section 3.2). From the beginning, the author expected problems related to the respondents ability to determine whether their companies are knowledge-based organisations (operating in the knowledge-based economy). As shown before, the definitions of the term "knowledge-based economy" are not unequivocal, besides it is difficult to apply methods of measurement of knowledge-based economy to enterprises. As revealed in the review of the available literature, precise definition of a knowledge-based organisation and its measurement exceeds current potential of researchers, international organisations and representatives of enterprises themselves. However, application of uniform terminology in research is so important that it was provided to respondents to let them assess whether their enterprises were already knowledge-based organisations (the terminology is described in section 1.2). The researcher attempted also to verify if there were differences in opinions dependent on level of management, sex and corporate results. One half of the respondent management staff declared that their enterprises were already knowledge-based organisations (operating in the knowledge-based economy), while 20% believed that the organisation was partially so. Only 5% of the respondent management staff acknowledged that their enterprises were not knowledge-based organisations (they didn't operate in the knowledge-based economy – Fig. 3.7). The obtained results lead to a conclusion that management staff of Lower Silesia had a more positive view of knowledge application at their enterprises than shown by international rankings and statistical data about Poland; this concerns especially management staff of enterprises listed in rankings.

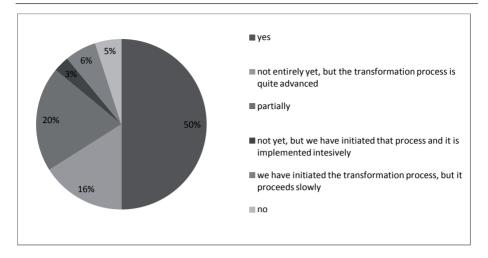


Fig. 3.7. Response to the question: is the enterprise you manage a knowledge-based organisation (it shapes the knowledge-based economy) (N = 433 persons) Source: original research.

This may be explained by the fact that probably respondents tried to present their enterprises somewhat more optimistically, but it may also indicate that they had already selected the right direction, seeing their competitive advantage potential in knowledge application, innovation, information and communication technologies, human capital and its development. In the analysed case, this situation may be interpreted differently, too. The high assessment of the respondent enterprises by their managers may be due to constant improvement of human capital: as shown by statistical data, the level of education increases and so does the rate of participation in lifelong learning. It is also of significance that Lower Silesian enterprises develop more dynamically than companies in other regions in Poland, supported by numerous foreign investments [*Raport Polska 2011. Gospodarka...* 2011, p. 10] and supply of well-educated staff from Lower Silesian universities.

Analysis of the data shown in Figure 3.8 suggests that the respondents' answers depended on the level of their management positions. The higher position of the manager, the stronger their conviction that their enterprise is a knowledge-based organisation (operating in the knowledge-based economy). Probably this is related to the fact that top management staff was already

focused in their strategies on development of the knowledge-based economy, seen as a development chance. However, as confirmed by the research, medium and low level management staff assessed the situation less optimistically (Fig. 3.8) and it should be stressed that it was them who had better knowledge of what went on inside organisations and of actual implementation of the knowledge-directed development strategy accepted by the enterprise. The observed discrepancy of opinions may indicate that there was a difference between the planned and actual degree of knowledge application.

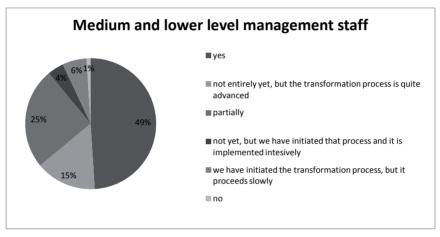
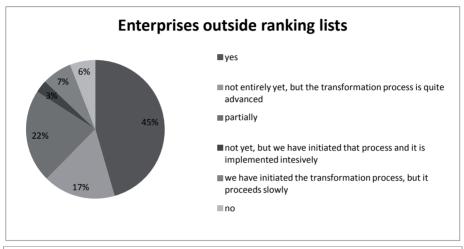




Fig. 3.8. Response to the question: is the enterprise you manage a knowledge-based organisation (it shapes the knowledge-based economy)? Differences of answers between top management and medium/lower management staff (N = 433 persons) Source: original research.

To a certain extent this situation should seem positive, because so clear focus on knowledge-based economy, as observed in top management staff may be an important factor in support of positive changes in enterprises and economy as a whole.

A more detailed analysis allowed for identification of differences in answers depending on corporate results (Fig. 3.9).



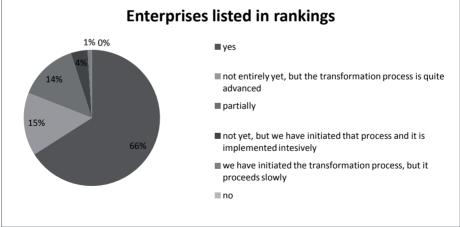
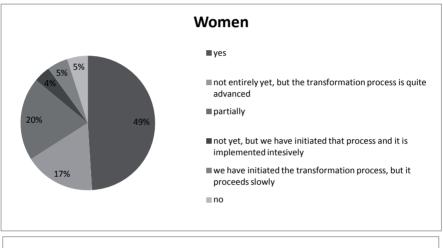


Fig. 3.9. Response to the question: is the enterprise you manage a knowledge-based organisation (it shapes the knowledge-based economy)? Differences of answers between management staff of the best enterprises listed in rankings and enterprises outside rankings (N = 433 persons)

Source: original research.

Sixty six percent of the management staff of enterprises listed in rankings of the best enterprises believed that their organisations were already entirely knowledge-based organisations, while in enterprises outside the lists this opinion was shared only by 46% of respondents (Fig. 3.9). This leads to a conclusion that the status of a knowledge-based organisation acted in favour of good corporate results in the contemporary economic, technological and social environment. The analysis of management staff's opinions on the analysed issue considering sex revealed no large or statistically significant differences. Women and men took similar positions on this question.



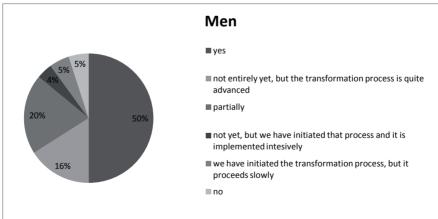


Fig. 3.10. Response to the question: is the enterprise you manage a knowledge-based organisation (it shapes the knowledge-based economy)? Differences of answers between women and men (N = 433 persons)

Source: original research.

The general analysis of the obtained data enables an approach to the studied fragment of Lower Silesia's economy and its assessment. The presented results allow for a conclusion that the economy in Lower Silesia is not yet entirely a knowledge-based economy and only some enterprises are knowledge-based organisations. It is a positive sign that they realised the fact. Considering the distance between the Polish enterprises in the knowledge-based economy and the European Union's average level or the most innovative countries in Europe (Denmark, Sweden, Germany) and in the world (USA, Japan, South Korea), it is necessary to undertake positive actions (by the state and the companies themselves) to improve this situation. Otherwise, the Polish economy will not be able to compete at the global market, when its main competitive advantage of low labour costs is lost, which can happen soon.

CHAPTER 4.

KEY COMPETENCIES OF MANAGEMENT STAFF IN THE KNOWLEDGE-BASED ECONOMY

- RESEARCH RESULTS

4.1. Opinions of management staff concerning key competencies in the knowledge-based economy

The basic research objective of this work was to identify those competencies of management staff which are crucial for management in the knowledge-based economy. This is why, apart from analysing the views presented in the specialist literature, as shown in the opening part of the book, the author collected also opinions of representatives of management staff of Lower Silesian enterprises. The focus was set on identification of differences in relevance assigned to particular competencies as well as the respondents' self-assessment of their strengths. This chapter presents the identified differences in answers of the respondent representatives of management staff considering management level, sex, size of the organisation, corporate results and knowledge application. The following comparisons were applied:

- management staff of knowledge-based enterprises listed in rankings vs. management staff of non-knowledge-based enterprises outside rankings;
- male and female management staff (men, women);
- low and top level management staff.

It describes also the identified correlations between the key competencies of management staff and corporate results of knowledge-based enterprises listed in rankings (which operate within the knowledge-based economy). The presentation of the obtained research results starts from an analy-

sis of opinions concerning relevance of psychological competencies in the knowledge-based economy.

4.1.1. Opinions about key psychological competencies of management staff in the knowledge-based economy

The results of the study allowed for determination which psychological traits were perceived by the respondents as crucial in the knowledge-based economy. It is worth noting that the respondents were of quite uniform opinion. Out of the psychological traits the following were defined as crucial for management in the knowledge-based economy: intellect / intelligence (92%), entrepreneurship (89%), diligence (85%), openness to experience (85%), emotional stability (79%) and analytical skills (79%). Further, the respondent management staff mentioned significance of such traits as emotional intelligence (77%), rapid reaction⁴³ (75%), extraversion (72%), activity (71%) and low reactivity (68%). More than a half of the respondents declared that such features were crucial for success in the knowledge-based economy as: rivalry skills (64%), striving to perfection (maximalist approach) (63%), amicability (54%), individual approach (53%) and focus on principles (42%).

A more detailed analysis revealed a range of significant differences dependent on management level, results achieved by the enterprise, internationalisation or knowledge application. These differences are shown below.

As far as significance assigned to psychological competencies is concerned, only one difference – small, but statistically relevant one (6%) was observed between answers provided by management staff of different level. Top management staff found entrepreneurship more significant in the knowledge-based economy. A statistically significant correlation was identified here indicating that the higher management position was held by the respondent, the larger significance was assigned to entrepreneurship in the knowledge-based economy (Tab. 4.1). These correlations were studied based on statistically significant tetrachoric correlations⁴⁴.

⁴³ Which indicates short time of reaction.

⁴⁴ The significance level for differences was defined at p-value equal to or lower than 0.1. If

Table 4.1. Correlation between psychological competencies of management staff and level of management (lower, top) (statistically significant tetrachoric correlations)

Key competencies of manage- ment staff in the knowledge-based economy – significance assigned	Correla- tions	Er- ror	Left end of the con- fidence interval	Right end of the con- fidence interval
Entrepreneurship	0.18	0.10	0.02	0.35

Source: original analysis of empirical results.

The binomial test which was held enabled a conclusion whether the differences of proportions for the two groups of positions were statistically significant. However, it did not allow for any conclusions concerning a tendency (trend) of the provided answers. Considering the research objective it was interesting to ask the following question: if a respondent assigns bigger significance to competencies in question, defining them as crucial in the knowledge-based economy, is more probable that this respondent belongs to a specific group, e.g. top level management. Hypotheses of this type were verified with Cochran-Armitage test⁴⁵. The analysis of the obtained results (statistics: 2.10, p-value = 0.04) allowed for definition of existence of tendencies (trends) providing that if a respondent found entrepreneurship as more crucial competency of management staff in the knowledge-based economy, then there is a statistically significant increase of probability that this person represented top management staff.

p-value fell within this interval, then the hypothesis that percentage differences between particular levels of management = 0 was rejected. Thus, it was concluded that the differences were statistically significant. The lower p-value, the better because of stronger argumentation for rejection of the hypothesis of no differences. Confidence intervals were applied, because they provide better recognition of the estimated value than the difference itself. The structure of such an interval is: (left end; right end), e.g. (-2.5%; 5,6%). As it is estimated at the confidence level (confidence level = 1, significance level = 0.9 or 90%), so the interpretation is as follows: it is 90% probable that the interval contains the estimated difference. This interval involves our confidence (90%) that the interval contains the difference in question. It can be interpreted in another way, too: if the study is held in a group of 100 respondents, then in 90% cases the difference will fall within this interval. Thus: with the interval of (5,7; 21,8) we can have a certainty of 90% that the value of the difference in the population will fall between 5,7% and 21,8%).

⁴⁵ Discussed in: [Agresti 2002; Liu, Berger, Hershberger 2005].

Especially interesting findings concerned identification of differences (proportion difference test) between opinions of management of knowledge-based enterprises listed in rankings and management staff of non-knowledge-based enterprises outside rankings (Tab. 4.2).

Table 4.2. Key psychological competencies of management staff in the knowledge-based economy as seen by respondents – statistically significant differences of significance assigned between management staff of knowledge-based enterprises listed in rankings of best enterprises and non-knowledge-based enterprises outside rankings (rankings & knowledge based-economy vs. outside rankings & non-knowledge-based economy)

Psychological competencies – significance assigned	Percentage dif- ferences rankings & knowledge based-economy vs. outside rankings & non-knowledge- based economy	Left end of the con- fidence interval	Right end of the con- fidence interval	p- value
Activity	16%	3%	28%	0.05
Rapid reaction	15%	3%	26%	0.07
Extraversion	14%	2%	27%	0.09
Striving to perfection – maximalist attitude	14%	1%	28%	0.09
Low reactivity	14%	2%	26%	0.08
Intellect, intelligence	10%	3%	18%	0.08

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

The analysis of the revealed differences leads to a conclusion that management staff of knowledge-based enterprises listed in rankings differs in its opinions on key competencies in the knowledge-based economy from management staff of non-knowledge-based enterprises outside rankings. Representatives of knowledge-based organisations listed in rankings put more stress on such competencies as activity, rapid reaction, extraversion, low reactivity⁴⁶ and striving to perfection. They also

⁴⁶ In this study low reactivity was defined as low sensitivity to disturbance, high efficiency, short phase of preparation for work, fast concentration on fundamental issues, ability to work intensively with maximal effort facing disturbance, noise, emotional difficulties, stress, time pressure or fatigue.

underlined the crucial importance of intelligence (Tab. 4.2). Thus, it can be concluded that these traits are more desirable in management staff in the knowledge-based environment and that they enable enterprises to achieve results which make them eligible for rankings.

4.1.2. Opinions on crucial knowledge of management staff in the knowledge-based economy

Even 80% of respondents believed that key knowledge competencies of management staff in the knowledge-based economy include basically technical/specialist knowledge and knowledge of management, as well as knowledge of economics (78%) and general knowledge (77%). For most respondents knowledge and understanding of issues concerning the enterprise and its staff (72%), knowledge of trends and forecasts in economy (72%) and psychological knowledge (65%) were crucial, too.

The performed analysis considering the management level of positions held by the respondents showed no differences in significance assigned to knowledge competencies between top and lower level management staff. However, the identified correlation allows for a conclusion that with the lower level of management, the greater importance is assigned by management staff in the knowledge-based economy to psychological knowledge.

Table 4.3. Statistically significant correlations between significance assigned to knowledge in the knowledge-based economy and level of management (lower, top)

Key competencies of management staff in the knowledge-based economy – significance assigned	Correla- tions	Error	Left end of the con- fidence interval	Right end of the con- fidence interval
Psychological knowledge	-0.14	0.08	-0.27	-0.01

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

The analysis of the results obtained from the Cochran-Armitage test (statistics: 1.80, p-value = 0.07) revealed a tendency (trend): if a re-

spondent assigned greater significance to knowledge and understanding of issues concerning the enterprise and its staff as a key competency of management staff in the knowledge-based economy, then the probability increased in a statistically significant way that the given person represented a lower level of management. This shows that management staff of this level focuses rather on problems of the human capital, which is crucial in the knowledge-based economy. Therefore, their role and importance in decision-making processes at enterprises should increase.

An interesting conclusion can be drawn from an analysis of empirical data considering both corporate results (ranking lists) and knowledge application (knowledge-based organisations). Large differences were identified between significance assigned to competencies between management staff of knowledge-based enterprises listed in rankings and management staff of non-knowledge-based enterprises outside rankings. Management staff of the first group assigned markedly larger significance in the knowledge-based economy to knowledge of economics and management, as well as knowledge of issues concerning the enterprise and its staff, and psychological knowledge (Tab. 4.4).

Table 4.4. Statistically significant differences of opinions between management staff of knowledge-based enterprises listed in rankings of best enterprises and non-knowledge-based enterprises outside rankings (proportion difference test)

Competencies – signifi- cance	Percentage dif- ferences rankings & knowledge based-economy vs. outside rankings & non-knowledge- based economy	Left end of the con- fidence interval	Right end of the con- fidence interval	p-value
Knowledge of economics	22%	13%	31%	0.00
Knowledge of management	22%	13%	32%	0.00
Knowledge and understanding of issues concerning the enterprise and its staff	20%	8%	31%	0.01
Knowledge of psychology	16%	3%	30%	0.06

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

This leads to a conclusion that these areas of knowledge are crucial in management in the knowledge-based economy. The above research results and the conclusion they bring allows for development of a basic postulate concerning the area of knowledge which should be put in focus in current training of management staff.

4.1.3. Opinions concerning crucial skills of management staff in the knowledge-based economy

The next component of management staff's competencies in the knowledge-based economy that was analysed within the study involved skills. The respondent management staff declared knowledge management skills as crucial in the knowledge-based economy (82%). It includes processes that enable creation, diffusion and application of knowledge to achieve objectives of the organisation, e.g. location, acquisition, development of knowledge, knowledge sharing and diffusion, knowledge application and protection. The respondents stressed also the importance of ability set objectives and methods to achieve them in the knowledge-based economy (82%). It is hardly surprising, since independence and innovativeness of management staff seems a decisive factor in such a variable, frequently unpredictable environment as the knowledge-based economy. Overall, the indicated crucial competencies in the knowledge-based economy included a range of skills related to management of human resources, such as:

- ability to create a right workplace for employees (to allow them to do what they are best at, providing the right materials and equipment, letting them know what they are supposed to do and that the manager takes their opinions into account, appreciates them and trusts them, that the manager cares about them, talks to them regularly, enhances their loyalty and commitment) (78%);
- talent management skills (selection, attracting, employment and maintenance of the most talented employees) (77%);
- social skills (methods of efficient persuasion and discussion, communication, conflict soothing, leadership, initiation and control of

change, shaping relationships, skills to share information and cooperation for common goals) (74%);

- skills to find education options for oneself and staff (70%);
- skills to translate corporate objectives to individual employees' objectives (higher pay, higher quality of life, implementation of individual aspirations, development, self-actualisation etc.) (68%).

The respondent management staff indicated also significance of skills necessary to manage an organisation, such as:

- ability set objectives and methods to achieve them (82%),
- negotiations skills (80%),
- ability to ensure high quality of work (79%),
- ability to recognise important issues and prioritise them (78%),
- ability to increase productivity (skills of analysing data to determine important issues concerning productivity, of setting and reviewing priorities and efficient use of working time) (78%),
- forecasting skills (75%).

The respondents mentioned also the following skills as key competencies of a manager in the knowledge-based economy:

- customer-focus skills (79%),
- economic skills (76%),
- application of information and communication technologies and techniques in business, including information acquisition (internet, e-libraries, data warehouses), e-commerce, distance working, management support (e.g. operational processes and decision-making), teamwork, communication (74%),
- ability to focus on intangible assets of the company (including its intellectual capital) (64%),
- related to acquisition and maintenance of competitive advantage at the international market (62%).

The author identified statistically significant differences between responses given by management staff at lower and top level of management, concluding that lower level management staff assigns more significance in the knowledge-based economy to social skills, forecasting skills and fluent communication in a foreign language (Tab. 4.5). This may suggest that their

hierarchy of significance is right and they perceive the growing importance of an individual within organisations, of internationalisation, cooperation and global communication. Social skills seem especially important, defined here as mastering methods of efficient persuasion and discussion, communication, conflict soothing, leadership, initiation and control of change, shaping relationships, skills to share information and cooperation for common goals.

Table 4.5. Key competencies of management staff in the knowledge-based economy – difference in significance assigned by top and lower level management staff

Key competencies in the knowledge- based economy - significance assigned	Differences between top and lower level manage- ment staff	Left end of the con- fidence interval	Right end of the con- fidence interval	p-value	Statisti- cally signifi- cant?
Social skills	-10.0%	-17.4%	-2.5%	0.03	yes
Forecasting skills	-7.7%	-15.2%	-0.3%	0.10	yes
Ability to communicate fluently in a foreign language	-7.5%	-15.2%	-0.3%	0.10	yes

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

Cochran-Armitage test (Tab. 4.6) revealed a tendency (trend) providing that if a respondent assigned more significance to social skills, ability to translate corporate objectives to individual employees' goals and abilities related to acquisition of competitive advantage at the international market as key competencies of management staff in the knowledge-based economy, then the probability increased in a statistically significant way that the respondent represented lower level management staff. It shows that lower level management staff is more focused on human capital and obtaining competitive advantage at the international market, which is crucial in the knowledge-based economy. One may be worried by the top management staff's assigning too little significance to these issues.

Similar results were obtained in the analysis of statistically significant tetrachoric correlations between significance assigned to skills in the knowledge-based economy and level of management.

Their analysis leads to a conclusion that the higher position held by the respondent, the lesser significance in the knowledge-based economy assigned to social skills, fluent communication in foreign languages, forecasting skills and ability to set goals and method of their achievement (Tab. 4.7).

Table 4.6. Correlations between significance assigned to competencies of management staff in the knowledge-based economy and level of management positions of respondents (Cochran-Armitage test)

Key competencies in the knowledge-based economy – significance assigned	(positive n	0	position: top s. lower level abers)
	statistics	p-value	significant?
Social skills	-2.19	0.03	yes
Ability to translate corporate objectives to individual employees' goals	-2.00	0.05	yes
Skills related to achievement of a competitive advantage at an international market	-1.89	0.06	yes

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

Table 4.7. Statistically significant correlations between significance assigned to knowledge in the knowledge-based economy and level of management (lower, top)

Correlations betw (lowe	veen varia r level, to		U	ent level	
Key competencies of management staff in the knowledge-based economy – significance assigned	Corre- lations	Er- ror	Left end of the con- fidence interval	Right end of the con- fidence interval	Sig- nifi- cant?
Social skills	-0.20	0.08	-0.34	-0.06	yes
Ability to communicate in a foreign language fluently	-0.17	0.09	-0.31	-0.02	yes
Forecasting skills	-0.16	0.09	-0.30	0.00	yes
Ability to set goals and methods to achieve them	-0.15	0.09	-0.30	0.00	yes

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

Doubtlessly, top level management staff does not focus on knowledge of foreign languages, because they can use them fluently, however, lesser significance assigned to forecasting and ability to set goals and method to achieve them is worrisome. Nowadays, there are constant changes in enterprises' environment, resulting from global, European, national and regional trends. The global character of economy makes it an interdependent organism. Changes in one part of the world bring immediate changes in other parts. Turbulent environment, intensified globalisation and competition, unstable markets, crisis and dynamic development of technologies result in rapid changes of competitive advantages of enterprises and it is very difficult to find new areas of competitive advantage. Similar problems are involved in formulation of strategic direction of organisations' development. Therefore, the role of forecasting and predicting risks and chances has grown in management. Even P.F. Drucker, having analysed the reality of modern business world indicated a new paradigm in management of enterprises in the 21st century, arguing that the domain of management of an enterprise was not limited to the company itself, because a modern manager had to be an entrepreneur, too, observing the company's environment with equal attention [quoted from: Czubasiewicz 2009]. Thus, management staff is expected to open to what is going on outside the organisation and to monitor constantly development trends and changes underway in the closest environment, but also in Europe and in the world. This can help them prepare their organisations for new chances, risks and challenges. Visualisation of future and forecasting events are not easy tasks due to their complexity and multi-disciplinary character. Forecasts, strategic documents and expert opinions about future are equivocal, sometimes controversial, or even opposite. Methodology is variable. It is still a difficult problem to determine a precise image of future. In the coming years, Polish enterprises will be in a more complicated situation, forced to increase expenses for new competitive advantages, because competitive advantage related to cheap labour is close to exhaustion. Without identification of main challenges facing the enterprises it will be difficult to find new advantages, it may be even impossible. Therefore, to develop new effective strategies for their enterprises,

managers, especially top level managers, should have thorough knowledge on current economic changes and development trends.

From the point of view of the research objectives, it was interesting to identify differences of opinions concerning key competencies in the knowledge-based economy between representatives of knowledge-based enterprises listed in rankings and non-knowledge-based enterprises outside rankings. A proportion difference test between these two groups was performed and the results are presented in Table 4.8.

Table 4.8. Key competencies of management staff in the knowledge-based economy as seen by respondents - statistically significant differences of opinions between management staff of knowledge-based enterprises listed in rankings of best enterprises and non-knowledge-based enterprises outside rankings (rankings & knowledge based-economy vs. outside rankings & non-knowledge-based economy) (% of responses)

Key competencies of management staff in the knowledge- based economy – significance assigned	Percentage differences rankings & knowledge based-economy vs. outside rank- ings & non- knowledge-based economy	Left end of the con- fidence interval	Right end of the con- fidence interval	p-value
Social skills	18%	6%	29%	0.02
Ability to recognise important issues and prioritise them	18%	7%	28%	0.02
Ability set objectives and methods to achieve them	17%	7%	26%	0.02
Ability to increase productivity	16%	6%	26%	0.02
Management skills	15%	6%	24%	0.03
Economic skills	14%	3%	25%	0.06
Forecasting skills	14%	3%	25%	0.06
Ability to create a right workplace for employees	13%	2%	24%	0.08
Knowledge management skills	13%	3%	23%	0.07

Source: original analysis of empirical results. (Appendix 1, questionnaire: question no. 2).

The obtained study results allow for a conclusion that management staff of knowledge-based enterprises listed in rankings put much stronger emphasis in the knowledge-based economy on such skills as recognising and prioritising important issues, setting objectives and methods of their achievement, increasing productivity, economic skills or forecasting. This is not a new result, but it is worth noting that management staff appreciates application of verified and recommended management principles (e.g. by the classical author P.F. Drucker) and that despite the time passing those principles are still valid.

The second group of competencies found important by the respondents are related to management of human resources, that is social skills, creating a right workplace for employees, knowledge management skills (Tab. 4.8). It can be concluded that this stress put on competencies of management staff has had direct effect on measurable increase of competitive advantage and corporate results of the analysed knowledge-based enterprises listed in rankings. Therefore, one can presume that selection of management staff with these competencies will contribute to the enterprise's success in the knowledge-based economy.

4.2. Sex as a factor of differences of management staff's opinions concerning key competencies in the knowledge-based economy

The results concerning the variable of sex as a factor of difference of opinions concerning key competencies of management staff in the knowledge-based economy confirmed that there were statistically significant differences (Tab. 4.9). The greatest differences between men and women concerned significance of amicability in the knowledge-based economy. This trait indicates not only frankness, trust, but it corresponds also to ability to cooperate, including shaping new contacts and maintaining previous ones. Women stress extraversion and diligence especially strongly. Women appreciate also significance of psychological and general knowledge, as well as knowledge of trends and forecasts affecting economy to a greater extent. Differences between women and men were visible in analysis of significance of key skills in the knowledge-based economy, too. Women accentuate signifi-

cance of ability to ensure high quality of work and to translate corporate objectives to individual employees' goals. This focus on human resources and ability to combine corporate interests and individual employees' goals may be women's advantage in the knowledge-based economy.

With Cochran-Armitage test a tendency (trend) was identified: if a respondent assigned greater significance in the knowledge-based economy to particular competencies, then there was a significant increase of probability that the respondent was a man or woman. The identified statistically significant trends are shown in Table 4.10.

Table 4.9. Key competencies of management staff in the knowledge-based economy - statistically significant differences of opinions between women and men

Key competencies in the knowledge-based economy – significance assigned	Differences: women - men	p- value
Knowledge of psychology	13%	0.01
Ability to ensure high quality of work	11%	0.01
Ability to translate corporate objectives to individual employees' goals	10%	0.05
Amicability	9%	0.10
General knowledge	9%	0.05
Extraversion	8%	0.07
Knowledge of trends and forecasts which affect economy	8%	0.08
Diligence	7%	0.08

Source: original analysis of empirical results.

Table 4.10. Key competencies of management staff in the knowledge-based economy as seen by respondents considering the variable of sex – tendencies / trends of significance assigned (statistically significant results of Cochran-Armitage test)

Key competencies in the knowledge-based economy – significance assigned	Sta- tistics	p- value	Trend / ten- dency (domi- nant sex)
Ability to ensure high quality of work	3.38	0.00	female
Psychological knowledge	2.92	0.00	female
Ability to translate corporate objectives to individual employees' goals	2.59	0.01	female
Diligence	2.57	0.01	female
Knowledge of management	2.52	0.01	female
Emotional stability	2.51	0.01	female

Knowledge of trends and forecasts which may affect economy	2.40	0.02	female
Ability set objectives and methods to achieve them	2.12	0.03	female
Extraversion	1.82	0.07	female
Degree of emotional intelligence	1.69	0.09	female
Skills to implement organisational culture of a learning, knowledge managing organisation	1.69	0.09	female
Focus on principles	1.67	0.09	female

Source: original analysis of empirical results.

The results' analysis proved that if a respondent assigned great significance to such psychological competencies in the knowledge-based economy as diligence and emotional stability, then it was 2.5 times more probable that it was a woman than a man.

The existence of this trend was confirmed also in assigning significance to particular areas of knowledge in the knowledge-based economy. If a respondent indicated knowledge of psychology management and knowledge of trends and forecasts that affected economy, then the probability that it was a women was 2.5 times higher. Similar results were obtained in identification of significance of key skills in the knowledge-based economy. If a respondent assigned big significance to the ability to ensure high quality of work, then it was three times more probable that it was a woman. Concerning ability to translate corporate objectives to individual employees' goals, setting objectives and methods to achieve them and skills to implement organisational culture of a learning, knowledge managing organisation, probability was two times higher for women. In the analysed case, this situation may be interpreted that women assign markedly larger significance to competencies which are crucial in the knowledge-based economy. This justifies a conclusion that a larger number of women in enterprises' management may have a positive effect on development of the knowledge-based society.

The analysis of respondents' answers considering not only sex, but also level of management, revealed that there were significant differences in opinions between women and men who held top management positions (Tab. 4.11).

Women in top management positions assigned markedly larger significance in the knowledge-based economy to such competencies as emotional intelligence, knowledge of psychology and knowledge of trends and forecasts which may affect economy. In the area of skills, women declared the following skills as key competencies: forecasting, focus on intangible assets of the company, customer focus, ensuring high quality of work and negotiations (Tab. 4.11).

Table 4.11. Key competencies of management staff in the knowledge-based economy - statistically significant differences of significance assigned between women and men at top management positions

Key competencies of management staff in the knowledge- based economy – significance assigned by top management staff (excluding owners and co-owners)	Differenc- es: women - men	p- value
Knowledge of psychology	30%	0.01
Forecasting skills	26%	0.01
Degree of emotional intelligence	21%	0.02
Knowledge of trends and forecasts which may affect economy	21%	0.04
Ability to focus on intangible assets of the company (which form its intellectual capital)	20%	0.07
Customer-focus skills	19%	0.05
Ability to ensure high quality of work	19%	0.04
Negotiating skills	18%	0.05

Source: original analysis of empirical results.

4.3. Self-assessment of management staff's strengths in the knowledge-based economy

In the process of identification of key management competencies in the knowledge-based economy it was assumed that it would rely on self-assessment of the respondents, as well as definition of differences of competencies between management staff of knowledge-based enterprises listed in rankings and management staff of non-knowledge-based enterprises outside rankings. The respondents were asked which competencies they had declared as crucial in the knowledge-based economy were their strengths⁴⁷. Then, competency differences between the two groups were identified. The analysis starts with psychological traits.

⁴⁷ Strength = talent + knowledge + skills. Talent is a recurrent thinking pattern which may be usefully applie [Buckingham, Clifton 2003].

4.3.1. Strengths of management staff in the knowledge-based economy – area of psychological traits

The respondents were asked to indicate psychological traits which were crucial in the knowledge-based economy which were their strengths and they indicated above all intellect/intelligence (79%), openness to experience (78%), diligence (77%), entrepreneurship (76%), as well as emotional intelligence (72%) and emotional stability (71%). Further, they listed the following as their strengths: extraversion (69%), analytical skills (68%), rapid reaction (65%), activity (64%), amicability (60%) and low reactivity (57%), striving for perfection (57%), rivalry skills (56%), individual approach (51%) and focus on principles (51%). The analysis of differences considering level of management shows that the respondent top management staff has significantly higher level of activity, analytical skills and entrepreneurship as compared to medium and lower level management staff (Tab. 4.12).

Table 4.12. Key competencies in management in the knowledge-based economy which are the strengths of the respondent management staff (% of responses) – statistically significant differences between top management staff and lower/medium level management staff

Key competencies of manage- ment staff in the knowledge- based economy which are the respondents' strengths	Differ- ences: top – lower level	Left end of the con- fidence interval	Right end of the con- fidence interval	p-value
Activity	11.7%	3.0%	20.4%	0.02
Analytical skills	9.2%	0.8%	17.7%	0.07
Entrepreneurship	8.0%	0.1%	16.0%	0.09

Source: original analysis of empirical results.

Statistically significant correlations were identified between psychological competencies and level of management. It was concluded that the higher management position of the respondent, the higher their activity, analytical skills, entrepreneurship and rivalry skills (Tab. 4.13).

Not only significant differences between responses by top and lower level management staff were identified, but also a tendency (trend). Cochran-Armitage test revealed that if rivalry skills, activity and entrepreneurship were a respondent's strength, then it was more than two times more probable that the respondent represented top level of management. A similar relationship was identified concerning emotional stability: this correlation was weaker, but still statistically significant (Tab. 4.14).

Table 4.13. Statistically significant correlations between key psychological competencies which are the respondent management staff's strengths and level of management (lower, top)

Key psychological competencies of management staff in the knowledge-based economy which are the respondents' strengths	Correlations between the vari- able and man- agement level (lower, top)	Error	Left end of the con- fidence interval	Right end of the con- fidence interval
Activity	0.19	0.08	0.06	0.32
Analytical skills	0.16	0.08	0.03	0.29
Entrepreneurship	0.15	0.08	0.02	0.29
Rivalry skills	0.14	0.08	0.01	0.26

Source: original analysis of empirical results.

Table 4.14. Cochran-Armitage test revealing statistically significant correlations between competencies of management staff and level of positions of respondents

Key psychological competencies of manage-	Position (top, lower)			
ment staff in the knowledge-based economy which are the respondents' strengths	statistics	p-value	signifi- cant?	
Rivalry skills	2.86	0.00	yes	
Activity	2.41	0.02	yes	
Entrepreneurship	2.34	0.02	yes	
Emotional stability	1.66	0.10	yes	

Source: original analysis of empirical results.

The analysis of key competencies with different statistical tests showed similar results. Interpretation of this situation may indicate on one hand that the following psychological competencies are strengths of the respond-

ent top management staff: high activity, analytical skills, entrepreneurship, rivalry skills and emotional stability. On the other hand, the results may allow a conclusion that the higher competencies characterise a manager, the better candidate for top management this person is.

For identification of key competencies of management staff in the knowledge-based economy it was important to confront competencies characterising two groups: management staff of knowledge-based enterprises listed in rankings vs. non-knowledge-based enterprises outside rankings.

Multiple statistically significant differences in competencies between these two groups were found. The compared data showed that management staff of knowledge-based enterprises listed in rankings had higher level of competencies and was characterised above all by higher emotional stability, openness to experience, amicability, diligence, intelligence and rapid reaction. It was also stronger at analytical skills, focus on principles and emotional intelligence, as well as individual approach and striving to perfection (Tab. 4.15).

Table 4.15. Strengths of management staff concerning psychological traits – statistically significant differences between management staff of knowledge-based enterprises listed in rankings vs. non-knowledge-based enterprises outside rankings (results of proportion difference test)

Key psychological competencies of management staff in the knowledge-based economy which are the respondents' strengths	Differences: knowledge- based & rankings vs. non-knowledge- based & outside rankings (%)	Left end of the con- fidence interval (%)	Right end of the con- fidence interval (%)	p- value
Emotional stability	23	11	35	0.00
Analytical skills	22	9	34	0.01
Focus on principles	21	7	35	0.02
Low reactivity	21	7	34	0.01
Openness to experience	20	9	31	0.01
Degree of emotional intelligence	19	7	31	0.01
Rapid reaction	19	6	32	0.02
Individual approach	17	3	31	0.04
Amicability	17	3	30	0.05

Diligence	16	5	28	0.03
Striving to perfection – maximalist approach	16	5	28	0.03
Intellect / intelligence	14	3	25	0.07
Entrepreneurship	13	1	25	0.10

Source: original analysis of empirical results.

These results lead to a conclusion that the mentioned psychological competencies are crucial in management in the knowledge-based economy and they affect corporate results. It is worth noting that the identified competencies of management staff considering level of management refer to the classical theory of skills by J. Katz (important role of conceptual skills at the highest levels) and Mintzberg model [cf. Mintcberg 1973] – the role of the entrepreneur. Additionally, rivalry is very important which may result from managers' responsibility for enterprises' competitive position at the much more difficult global market. Meanwhile, emotional stability refers to the well-known concept of emotional intelligence by D. Goleman, who stressed its meaning in managers' work ever since the 1990s. Considering the obtained results, one may conclude that the Polish management staff in enterprises with outstanding results is increasingly similar in competencies to the model management staff of developed knowledge-based economies: in this cases the references were to American models. Larger significance is involved nowadays with such competencies of management staff as focus on principles and rapid reaction, too. They are "the sign of our times" in management. Similar reflections concern such competencies as knowledge management, talent management or skills related to application of information and communication technologies.

4.3.2. Knowledge which is the strength of management staff in the knowledge-based economy

Results of the study revealed that the knowledge which was crucial in the knowledge-based economy and which was management staff's strength involved basically general knowledge (77%) and specialist knowledge (73%). It may be surprising that knowledge of management is ranked only third as re-

spondents' strength (65%). Other strengths of the respondent management staff include knowledge of issues concerning the enterprise and staff (64%), knowledge of economics (61%), knowledge of trends and forecasts which affect economy (60%) and psychological knowledge (54%).

The analysis considering the criterion of management level revealed only one statistically significant difference. Lower level management staff had larger knowledge of issues concerning the enterprise and its staff as compared to top level management staff (Tab. 4.16).

Crucial importance of this competency was confirmed also by the identified statistically significant correlation (-0.19) that the lower management position, the larger knowledge of issues concerning the enterprise and its staff.

Table 4.16. Key knowledge in management in the knowledge-based economy which is the strength of the respondent management staff (% of responses) – statistically significant differences between top management staff and lower/medium level management staff

Key knowledge of manage-	Differ-	Left end	Right end	p-value
ment staff in the knowledge-	ences: top	of the con-	of the con-	
based economy which are	– lower	fidence	fidence	
the respondents' strengths	level	interval	interval	
Knowledge and understanding of issues concerning the enterprise and its staff	-11.8	-20.3	-3.3	0.02

Source: original analysis of empirical results.

The fact that lower level management staff was more focused on the issues of the enterprise and its staff, was revealed by Cochran-Armitage test, which showed that if the respondent's strength was knowledge of issues concerning the enterprise and its staff, then it was more than twice more probable that the respondent represented lower level of management (statistics = -2.20).

The obtained results suggest that lower level management staff is significantly more focused on human capital in the organisation than top level management.

Interesting conclusions may be drawn from the analysis of the empirical data considering knowledge application and corporate results of the organisation. Proportion difference test was performed to verify whether there was a correlation between competencies and two groups of respondents (management staff of knowledge-based enterprises listed in rankings vs. non-knowledge-based enterprises outside rankings). Management staff of knowledge-based enterprises listed rankings had significantly bigger knowledge of economics and issues concerning enterprises and their staff, as well as larger general knowledge, knowledge of management, knowledge of trends and forecasts affecting the economy and specialist knowledge (Tab. 4.17).

Table 4.17. Strengths of management staff concerning knowledge – statistically significant differences between management staff of knowledge-based enterprises listed in rankings and non-knowledge-based enterprises outside rankings (results of the proportion difference test)

Key knowledge of management staff in the knowledge-based economy which are the respond- ents' strengths	Differences: knowledge- based & rankings vs. non-knowledge- based & outside rankings	Left end of the con- fidence interval	Right end of the con- fidence interval	p- value
Economic knowledge	32	20	44	0.00
Knowledge and understanding of issues concerning the enterprise and its staff	28	15	40	0.00
General knowledge	23	13	33	0.00
Knowledge of management	23	10	35	0.01
Knowledge of trends and forecasts which affect economy	20	6	33	0.02
Technical, specialist knowledge	16	4	28	0.05

Source: original analysis of empirical results.

Concluding, one may say that the knowledge-based economy requires management staff of much broader knowledge. It is worth stressing that currently in the knowledge-based economy not only focus on knowledge of economics or management, general or specialist knowledge is needed, but

also – or above all – knowledge of issues concerning the enterprise and its staff, as well as trends and forecasts that affect economy.

4.3.3. Skills which are the strengths of management staff in the knowledge-based economy

The respondents indicated very many skills which they found crucial in the knowledge-based economy and which were their strengths. They listed the following skills as their strengths: above all customer focus skills (72%) and skills to ensure high quality of work (72%). Besides, they mentioned also skills related directly to implementation of basic functions of managing an organisation (72%), such as planning, organising, human resources management (motivating) and control, as well as ability to recognise and prioritise important issues (72%), negotiating skills (69%) or setting objectives and methods to achieve them (66%).

The respondents indicated also those skills as crucial which are directly related to the knowledge-based economy, that is:

- knowledge management skills (all processes which allow for creation, diffusion and use of knowledge to achieve organisational goals; location, acquisition, development of knowledge, knowledge sharing and diffusion, application and maintenance of knowledge) (65%),
- skills to apply modern information and communication techniques and technologies in business, including: information retrieval (internet, e-libraries, data warehouses), e-commerce, distance work, distance learning, management support, including support for operational processes and decision making, teamwork, communication (61%),
- skills to implement organisational culture of a learning, knowledge managing organisation (59%),
- ability to focus on intangible assets of the company (55%).

A vast majority of respondents found also human capital management skills as their strength, including especially:

- ability to create a right workplace for employees (67%),
- talent management skills (65%),

- social skills (65%),
- skills to find education options for oneself and staff (60%),
- ability to translate corporate goals to employees' individual objectives (57%).

However, one may be worried by the fact that the respondent management staff estimated their skills related to achievement of competitive advantage at international markets quite low (43%).

Analysis of the empirical data considering differences related to the level of management revealed only one statistically significant difference concerning skills which are crucial in the knowledge-based economy. It turned out that top management staff (as compared to the medium and lower management staff) has significantly larger negotiating skills (difference of 11.4%). This fact was confirmed by the identified statistically significant tetrachoric correlation (0.20), which indicated that the higher management position, the bigger negotiation skills. In order to verify statistically significant correlations between management staff's skills and level of management, Cochran-Armitage test was applied, too. It revealed that if negotiating skills and customer focus were a respondent's strength, then it was almost two times more probable that the respondent represented top level management staff. However, if the ability to translate corporate objectives to employees' individual goals was a respondent's strength, then it was almost two times more likely that the respondent represented lower level management staff (Tab. 4.18).

Table 4.18. Cochran-Armitage test revealing statistically significant correlations between competencies of management staff and level of positions of respondents

Key competencies of management staff in the	Position (top, lower)			
knowledge-based economy which are the respondents' strengths	statistics	p-value	signifi- cant?	
Ability to translate corporate goals to employees' individual objectives	-1.72	0.09	yes	
Negotiating skills	1.66	0.10	yes	
Customer focus skills	1.65	0.10	yes	

Source: original analysis of empirical results.

Thus, the above analysis allows for a conclusion that a strength of lower level management staff concerns combining objectives of the organisation and employees, while in the case of top management staff – negotiating skills and focus on customer.

Table 4.19. Key competencies of management staff in the knowledge-based economy which are the respondents' strengths – statistically significant differences between management staff of knowledge-based enterprises listed in rankings and non-knowledge-based enterprises outside rankings (results of the proportion difference test)

Key knowledge of management staff in the knowledge-based economy which are the respond- ents' strengths	Differences: knowledge-based & rankings vs. non-knowledge- based & outside rankings	Left end of the con- fidence interval	Right end of the con- fidence interval	p- value
Ability to focus on intangible assets of the company (which form its intellectual capital)	25	11	39	0.00
Ability to communicate fluently in a foreign language	23	10	36	0.01
Management skills	23	11	35	0.00
Knowledge and knowledge staff management skills	22	9	35	0.01
Marketing skills	20	6	33	0.02
Ability to set objectives and methods to achieve them	19	6	32	0.03
Ability to increase productivity	19	6	32	0.03
Customer focus skills	18	6	29	0.02
Ability to translate corporate goals to employees' individual objectives	18	4	32	0.04

Source: original analysis of empirical results.

Considering results achieved by the organisations and knowledge application, it turned out that management staff of knowledge-based enterprises listed in rankings had significantly higher skills than management staff of non-knowledge-based enterprises outside rankings. It was much better at focusing on intangible assets of the company, use of foreign languages knowledge management. Is also had larger marketing skills, it could

set new objectives and methods to achieve them better, increase productivity, it was more focused on customer and it could translate corporate objectives to employees' individual goals (Tab. 4.19).

It is worth noting that in both studied groups there were no significant differences concerning skills of application of information and communication techniques and technologies. This may mean that their significance in the knowledge-based economy is lesser, but also – which is more probable – it may indicate that this is Polish management staff's weakness. This confirms the existing distance between the Polish economy and the average level of the European Union and OECD concerning application of information and communication technologies.

4.4. Strengths of men and women in ranked enterprises in management in the knowledge-based economy

The analysis began with identification of statistically significant differences among management staff concerning those competencies which are their strengths in the knowledge-based economy considering the criterion of sex. It turned out that men had larger rivalry skills and larger technical/specialist knowledge. Meanwhile, women were stronger at knowledge and understanding of issues concerning the enterprise and its staff, larger psychological knowledge, diligence and amicability (Tab. 4.20).

Table 4.20. Key competencies of management staff in the knowledge-based economy which are the respondents' strengths – statistically significant differences considering the criterion of sex

Key knowledge of management staff in the knowledge-based economy which are the respond- ents' strengths	Differen ces: woman - man	Left end of the con- fidence interval	Right end of the con- fidence interval	p- value
Knowledge and understanding of issues concerning the company and its staff	10.40%	18.60%	2.20%	0.04
Psychological knowledge	9.80%	18.20%	1.30%	0.06
Diligence	9.40%	16.40%	2.40%	0.03

Amicability	9.00%	17.30%	0.70%	0.08
Technical / specialist knowledge	-10.20%	-2.40%	-17.90%	0.03
Rivalry skills	-14.00%	-5.50%	-22.40%	0.01

Source: original analysis of empirical results.

In the knowledge-based economy knowledge of issues and problems concerning not only the enterprise, but its staff, too, seems especially valuable, as human capital is an essential asset there. Women's stronger focus on interests of the enterprise and staff may ensure full commitment of employees. Women's broader psychological knowledge will be necessary in more efficient management of human capital. The identified higher diligence among women may be useful in any economy, including the knowledge-based economy. According to the definition included in the "Big Five" description of personality, it involves stronger self-organisation, precision, effectiveness, responsibility, ambition, consistence, self-discipline, conscientiousness, striving to achievement, independence in setting objectives and their accomplishment, reason, order, practical approach and hard-working attitude. Also, women's amicability, defined as willingness to help, readiness to forgive, positive attitude and frankness may have positive value in the knowledge-based economy where management supervises high-class specialists, so-called knowledge staff, supports work based on creativeness and innovation, as well as builds strategic advantage on unique competencies of employees and networks of interrelated networks of partner enterprise.

The stronger skills in rivalry, as observed in men, also seem useful in the knowledge-based economy, as this is a highly competitive economy. Nowadays, globalisation has imposed a necessity to face much more intensive competition, and therefore this competency helps men cope with modern challenges in this area. Similarly, technical/specialist knowledge, which is strongly demanded nowadays, helps men find sources of competitive advantages, making it easier to reach new markets in the economy based on innovation.

Considering the characteristics of the knowledge-based economy, it is clearly visible that in such environment strengths identified in women and in men are both valuable. Therefore, it seems justified to conclude that the knowledge-based economy requires cooperation of men and women in management.

A more detailed analysis allowed for observing significant differences related to the criterion of management level. At the top management level two significant differences were identified as typical for women. They were stronger at diligence (difference = 11, p-value = 0.05) and emotional intelligence (difference = 17, p-value = 0.09), while men were stronger at technical/specialist knowledge (difference = 17, p-value = 0.01), talent management skills (difference = 13, p-value = 0.06) and rivalry skills (difference = 12, p-value = 0.07).

In this area, too, the identified strengths of both women and men seem crucial in the knowledge-based economy. The higher emotional intelligence revealed in women is a decisive factor for self-awareness, self-management, motivation, ability to understand team members' situation and reactions, empathy, well-planned relations with others. Therefore, in the knowledge-based economy, where people are a crucial asset and decisive element of competitive advantage, this trait seems necessary. Talent management skills are very important for functioning in the knowledge-based economy, too, and the research revealed that they were men's strength. Certainly, this is their advantage, if they are better than women in selecting, attracting, employing and maintaining the most talented employees at their enterprise.

There were interesting results of comparison of responses considering:

- women in management positions in knowledge-based enterprises listed in rankings vs. women in management positions in nonknowledge-based enterprises outside rankings,
- men in management positions in knowledge-based enterprises listed in rankings vs. men in management positions in nonknowledge-based enterprises outside rankings,
- women in management positions in knowledge-based enterprises listed in rankings vs. men in management positions in knowledge-based enterprises listed in rankings.

This revealed not only statistically significant differences in competencies between the analysed groups, but also their strengths. The analysis started with comparison of responses by female managers and it turned out that respondents from knowledge-based enterprises listed in rankings had significantly larger knowledge of trends and forecasts affecting the econo-

my (difference = 28, p-value = 0.04), focus on principles (difference = 26, p-value = 0.06), knowledge of economics (difference = 25.5, p-value = 0.05) and knowledge of problems concerning the enterprise and its staff (difference = 25.5, p-value = 0.06). Concerning men, there were very big statistically significant differences in favour of knowledge-based enterprises listed in rankings. Those differences are presented in Table 4.21. The largest differences concerned knowledge of economics, ability to focus on intangible values of the organisation and fluent communication in a foreign language, also general knowledge and knowledge of problems concerning the enterprise and its staff. These managers are also much stronger at: knowledge and knowledge staff management skills, translation of the enterprise's objectives to individual employees' goals, skills to find education options for oneself and staff, analytical skills and focus on customer. Considering the "Big Five" personality traits, they have higher intensity of emotional stability and openness to experience.

Table 4.21. Key competencies of management staff in the knowledge-based economy which are the respondents' strengths – statistically significant differences between male managers of knowledge-based enterprises listed in rankings and male managers of non-knowledge-based enterprises outside rankings (results of the proportion difference test)

Key knowledge of manage- ment staff in the knowledge- based economy which are the respondents' strengths	Differences: man in knowledge- based & rankings vs. man in non- knowledge-based & outside rankings	Left end of the con- fidence interval	Right end of the con- fidence interval	p- value
Knowledge of economics	37%	20%	54%	0.00
Ability to focus on intangible assets of the company	33%	16%	51%	0.00
Rapid reaction	32%	16%	49%	0.00
Ability to communicate fluently in a foreign language	31%	15%	47%	0.01
Low reactivity	31%	13%	48%	0.01
General knowledge	31%	17%	44%	0.00
Knowledge and understanding of problems concerning the enterprise and its staff	29%	11%	46%	0.01
Analytical skills	27%	12%	43%	0.01

Intellect / intelligence	26%	15%	38%	0.01
Skills to manage knowledge and knowledge staff	26%	9%	44%	0.02
Striving for perfection – maximalist approach	26%	8%	44%	0.02
Ability to translate corporate objectives to individual employees' goals	26%	6%	45%	0.03
Knowledge of management	25%	8%	43%	0.03
Management skills	25%	10%	40%	0.02
Emotional stability	25%	8%	41%	0.03
Degree of emotional intelligence	24%	8%	40%	0.03
Marketing skills	24%	6%	42%	0.04
Ability to increase productivity	23%	6%	41%	0.04
Social skills	23%	6%	40%	0.04
Ability to recognise and prioritise important issues	22%	4%	41%	0.05
Ability to set objectives and methods to achieve them	22%	4%	40%	0.06
Amicability	22%	6%	37%	0.05
Openness to experience	21%	6%	37%	0.05
Skills to find education options for oneself and staff	21%	3%	40%	0.07
Individual approach	21%	2%	40%	0.07
Skills to implement organisational culture of a learning, knowledge managing organisation	21%	2%	40%	0.08
Customer focus skills	21%	5%	36%	0.06

Source: original analysis of empirical results.

There were also differences identified between competencies of women and men in knowledge-based enterprises listed in rankings. Surprisingly, only one statistically significant difference was found: men assessed their intelligence higher (difference: 23, p-value = 0.05). However, differences in other competencies are worth analysing, too, as they were large, even though they turned out to be statistically insignificant. This was probably due to the too low number of both women and men who met both conditions (enterprise listed in rankings and knowledge-based organisation at the same time). Certainly, research in this area should be continued and based on

a larger sample. Despite these limitations, the analysis of found differences (Tab. 4.22) brings some reflections and conclusions.

Table 4.22. Key competencies of management staff in the knowledge-based economy which are the respondents' strength – differences between women and men at knowledge-based enterprises listed in rankings (proportion difference test)

Key competencies in the knowledge-based economy – strengths	Differences: woman in knowledge-based & rankings vs. man in knowledge-based & ranking	p- value	Statistically significant?	Domi- nant sex
Extraversion	20%	0.22	no	female
Ability to ensure high quality of work	14%	0.42	no	female
Knowledge of trends and fore- casts which affect economy	12%	0.55	no	female
Focus on principles	11%	0.61	no	female
Analytical skills	-12%	0.45	no	male
Ability to communicate fluently in a foreign language	-15%	0.38	no	male
Ability to focus on intangible assets of the company	-15%	0.46	no	male
Low reactivity	-15%	0.39	no	male
Ability to recognise and prioritise important issues	-18%	0.26	no	male
Striving to perfection – maximalist approach	-18%	0.30	no	male
Talent management skills	-18%	0.30	no	male
Social skills	-18%	0.25	no	male
Skills to find education options for oneself and staff	-21%	0.21	no	male
Rapid reaction	-22%	0.15	no	male
Intellect / intelligence	-23%	0.05	yes	male
Application of information and communication technologies and techniques	-27%	0.11	no	male

Source: original analysis of empirical results.

Women have higher level of extraversion which certainly is useful in the knowledge-based economy. They have larger skills to ensure high quality of work, greater knowledge of trends and forecasts that affect economy and higher focus on principles. The identified differences suggest that men have higher competencies in many areas. The largest differences were identified concerning skills to apply information and communication techniques and technologies (including: data retrieval – internet, e-libraries, data warehouses; e-commerce; distance work; distance learning; management support, e.g. support of operational processes and decision-making; teamwork; communication). This large competency gap in women (as compared to men) in this area should be found worrisome. Certainly, it reduces women's chances in management in the knowledge-based economy. Men have also much larger skills in searching for and finding education options for themselves and their staff, talent management, focus on intangible assets and social skills. They are also more focused on striving to perfection (maximalist approach) and priorities.

4.5. Competency gap which makes management in the knowledge-based economy difficult

The performed analysis of opinions of the respondent management staff concerning significance of particular competencies indicated as crucial in the knowledge-based economy and their comparison to self-assessment whether these competencies are their strengths, allowed for identification of a competency gap which makes it harder for them to manage enterprises in the knowledge-based economy. It was revealed that, regardless of sex, age, level of management, results achieved by their enterprises and their knowledge application, some respondents assess that they don't have so high competencies as required in the knowledge-based economy (Fig. 4.1). This shows that the respondents were aware of their deficiency in competencies and certain misadaptation of competencies to management in the knowledge-based economy. The identified differences between significance assigned in the knowledge-based economy to particular psychological traits and their assessment as strength is shown in Fig. 4.1.

The obtained data should be interpreted as follows: e.g. 75% of respondents believed that openness to experience was crucial in the knowledge-based economy and that this was their strength (consistency of competencies held and demand of the knowledge-based economy). Meanwhile, 25% of respondents assessed their openness to experience as lower than required for management in the knowledge-based economy. In the case of some competencies, even a half of the respondents perceived their misadaptation to the conditions of the knowledge-based economy. This process is visible in such psychological competencies as: focus on principles, individual approach, striving to perfection, rivalry skills or low reactivity (Fig. 4.1).

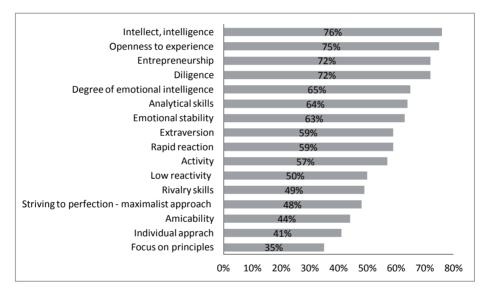


Fig. 4.1. Key psychological competencies of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength Source: original analysis of empirical results.

Competency gap was also identified in the area of knowledge – especially in the case of psychological knowledge (54% of respondents). This knowledge is very important in the knowledge-based economy, considering management of human resources. There was also an identified deficiency of knowledge of trends and forecasts affecting economy. This problem was noted by as many as 46% of respondents (Fig. 4.2). This should be perceived

as worrisome. Knowledge-based economy is characterised by marked variability and large influence of environment on functioning of organisations, which results in unpredictability and increased risk. Therefore, it requires constant (permanent) diagnosis and analysis of economic changes and development trends which would allow for shaping of efficient organisational strategies in the knowledge-based economy. There was also a competency gap identified concerning knowledge of problems which were important for the enterprise and its staff (46%). It proves that so far, the respondent management staff had too little focus on joint problems of the enterprise and staff. Knowledge-based economy requires greater care for human capital. It was positive that the respondents were aware of the fact (Fig. 4.2).

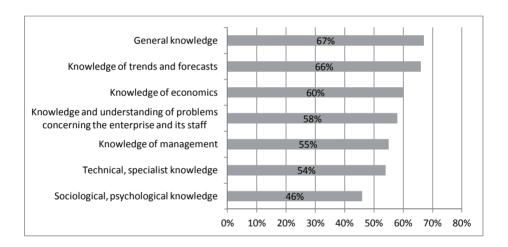


Fig. 4.2. Key knowledge of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength Source: original analysis of empirical results.

Even larger deficiency was observed in the area of skills needed in management in the knowledge-based economy. The greatest ones involved skills related to obtaining competitive advantage at international markets (62%). The situation is similar in the case of skills which seem crucial in the knowledge-based economy, e.g. focus on intangible assets of the organisation, finding education options for oneself and employees, as well as trans-

lating corporate objectives to individual employees' goals. Every second respondent reported such problems (Fig. 4.3).

The competency gap is clearly visible in skills of application of information and communication techniques and technologies, including: information retrieval (internet, e-libraries, data warehouses), e-commerce, distance work, distance learning, management support, teamwork and communication (45%). There is an analogic situation concerning skills to implement organisational culture of a learning, knowledge-managing organisation, while 39% of respondents didn't have relevant skills to manage talents. The problems were lesser in the case of skills to focus on customers and high quality, although even here, every third person reported deficiencies (Fig. 4.3).

The researcher compared results of self-assessment of the respondent management staff concerning lack of management competencies considering the level of management. It turned out that more managers of lower level (as compared to the top level) perceived their misadaptation to the knowledge-based economy, especially in the area of analytical skills (lower level: 41%, top level: 31%), entrepreneurship (lower 35%, top 48%) and rivalry skills (lower 56%, top 48%). The competency gap was larger for lower level of management in all areas except for knowledge of problems concerning the enterprise and its staff (lower 37%, top 45%). In this single case, larger gap was identified in the top level management staff. Interestingly, regardless of management level, managers perceived their deficiencies of skills in the knowledge-based economy similarly. Differences were slight and only in the case of negotiating skills lower level managers reported greater gap (top: 43%, lower: 34%). Only one significant difference was identified: in the ability to translate corporate objectives to employees' individual goals (lower 43%, top 53%). Top level management staff had a larger competency gap in this area. Once again, it turned out that the lower management staff focused on employees' interests in their organisations.

Existence of a competency gap in management staff was verified considering the criterion of sex. In the area of competency of diligence, 32% of men reported certain level of misadaptation to the knowledge-based economy (68% believed they had relevant competencies) and only 21% of women

(79% of women reported no deficiency). A similar situation concerned extraversion (45% of men and 34% of women), rapid reaction (44% of men and 37% of women), emotional intelligence (38% of men, 30% of women) or focus on principles (69% of men and 59% of women) (Fig. 4.4).

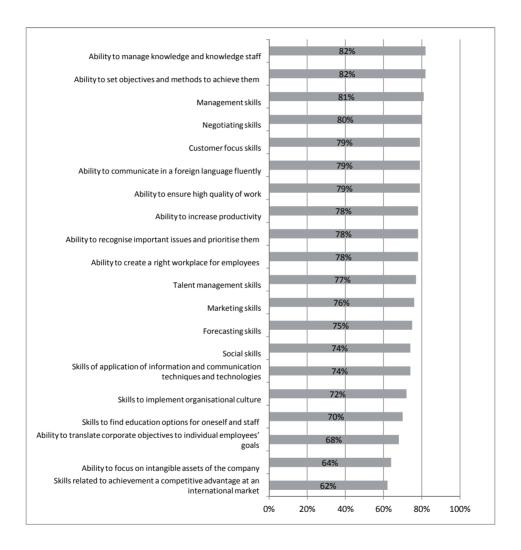


Fig. 4.3. Key skills of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength Source: original analysis of empirical results.

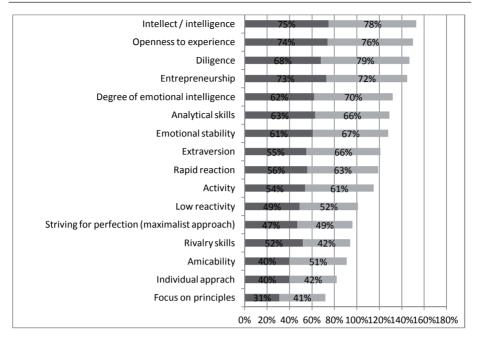


Fig. 4.4. Key psychological competencies in the knowledge-based economy – consistency of significance of a given competency and its strength – differences between sexes Source: original analysis of empirical results.

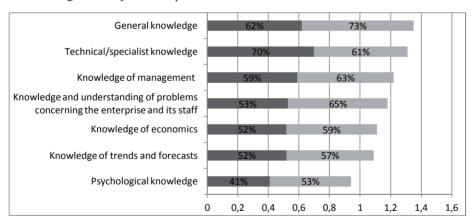


Fig. 4.5. Key knowledge of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength – differences between sexes Source: original analysis of empirical results.

It seems justified to conclude that in these areas women's competencies are better adapted to the knowledge-based economy. The respondents stressed their deficiency in the focus on principles especially strongly. This proves that they were aware of its large role in the knowledge-based economy and on the other hand this may show that previously management by permanent and fundamental values used to be a big problem for them. As for rivalry skills, 58% of women and 48% of men reported competency gap. These results allow for a conclusion that women assess their competencies higher concerning diligence, extraversion, rapid reaction and emotional intelligence and lower concerning rivalry.

There was also an analysis performed concerning the gap in knowledge of the respondent management staff. Men reported deficiency in knowledge of problems concerning the enterprise and its staff, psychological and general knowledge, while women – in technical/specialist knowledge (Fig. 4.5).

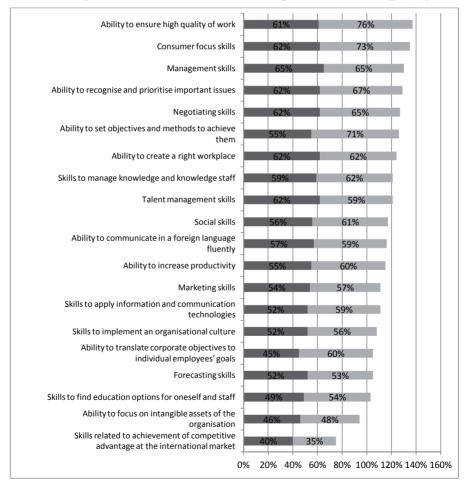


Fig. 4.6. Key psychological skills of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength – differences between sexes Source: original analysis of empirical results.

There were larger sex-related differences identified in the area of skills. In general, for almost all analysed skills, fewer women than men reported competency gaps. This may be due to the fact that women are better educated, as evidenced by statistical data. However, it is interesting that women perceived their deficiency of skills to apply modern information and communication techniques and technologies in business to a lesser extent than men (Fig. 4.6).

However, as shown by the analysis discussed in section 4.4, men in knowledge-based enterprises listed in rankings have significantly larger skills in this area than women. Therefore the possible conclusion provides that women are not entirely aware of the significance of these competencies in the knowledge-based economy and their own gap in this area.

At the same time, the analysis considering application of knowledge in the respondent's organisations allows for a conclusion that management staff in the knowledge-based economy had markedly lesser competency gap than management staff outside the knowledge-based economy. For all analysed psychological competencies management staff in the knowledge-based economy declared greater consistency of their strengths with the postulated level required in the knowledge-based economy. Some managers outside the knowledge-based economy confirmed their misadaptation as largest in analytical skills, emotional stability, intelligence, openness to experience, diligence, rapid reaction, striving to perfection, individual approach and focus on principles (Fig. 4.7).

Analogically, in all analysed areas of knowledge, management staff of the knowledge-based economy reported lesser gap than management staff outside the knowledge-based economy (consistency of strengths of management staff in the knowledge-based economy with postulated level of competencies is higher). The greatest differences of competency misadaptation were revealed in the knowledge of management, economics, knowledge of issues concerning the enterprise and its staff, as well as knowledge of trends and forecasts that affect economy, but also in general knowledge and technical/specialist knowledge (Fig. 4.8).

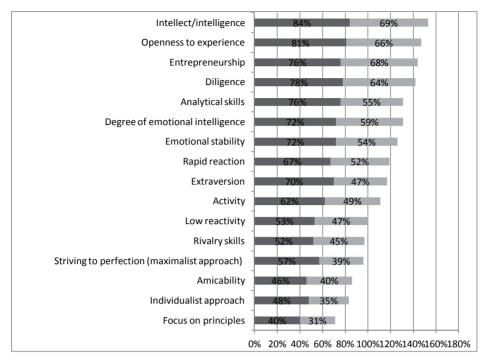


Fig. 4.7. Key psychological skills in the knowledge-based economy – consistency of significance attributed to the given competency and its strength – differences between management staff within and outside the knowledge-based economy Source: original analysis of empirical results.

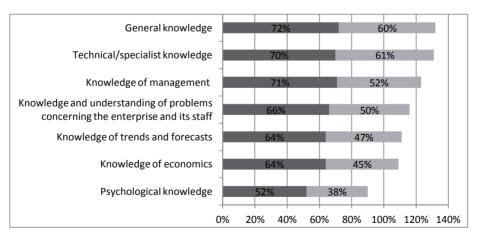


Fig. 4.8. Key knowledge of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength – differences between management staff in the knowledge-based economy and outside knowledge-based economy. Source: original analysis of empirical results.

There were also interesting results revealed by analysis of the obtained empirical data in the context of a gap in skills between the two study groups. A much lesser part of management staff in the knowledge-based economy reported skills deficiency than outside the knowledge-based economy. This concerns all analysed skills, which allows for a conclusion that management staff in the knowledge-based economy had much better skills. In the case of non-knowledge-based economy the competency gap concerned especially negotiating skills and social skills defined as knowledge and application of methods of efficient persuasion and discussion, communication, conflict soothing, leadership, initiating and managing change, striking relations, ability to share information and cooperate for common goals (Fig. 4.9).

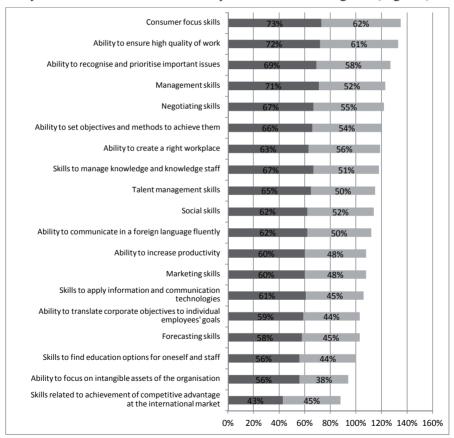


Fig. 4.9. Key skills of management staff in the knowledge-based economy – consistency of significance of a given competency and its strength – differences between management staff in the knowledge-based economy and outside knowledge-based economy Source: original analysis of empirical results.

Significant differences in deficiency of competencies among management staff outside the knowledge-based economy were identified also for skills of management of "knowledge staff" and knowledge they held, defined basically as overall processes to allow creation, diffusion and application of knowledge for the organisation's goals, acquisition and development of knowledge, knowledge sharing and promotion, using and maintenance of knowledge. The situation is similar for such skills as: application of modern information and communication technologies and techniques in business, translating corporate objectives to individual employees' goals or ability to focus on intangible assets of the organisation (Fig. 4.9).

The above conclusions show that management staff of enterprises within the knowledge-based economy is characterised by a lesser competency gap than management staff outside the knowledge-based economy. Despite the identified differences, it seems justified to conclude that there is a gap in competencies of management staff which are crucial in the knowledge-based economy.

4.6. Synthesis and conclusions

It turned out that considering the held competencies, the respondent management staff was not uniform, but still synthetic characteristics may be provided. According to their self-assessment, they were characterised by high intelligence, openness to experience, diligence, entrepreneurship and emotional stability. They were active, they made rapid decisions, they were ready to take risks and new tasks. Most managers had low reactivity, i.e. low sensitivity to disturbances, short phase of preparation to work, faster concentration on fundamental actions, ability to work intensively at maximal rate facing disturbances, emotional difficulties and strong stress, time pressure or fatigue. Regardless of sex, age and management level, some managers didn't have such high psychological competencies as required in the knowledge-based economy, and they were aware of the fact. They perceived their misadaptation in such areas as focus on principles, individual approach, striv-

ing to perfection, rivalry skills or low reactivity. As far as knowledge is concerned, the respondent management staff were especially strong at general knowledge and technical/specialist knowledge, knowledge of management and economics to a lesser extent. The largest deficiencies were revealed in the knowledge of trends and forecasts affecting economy, knowledge of problems concerning the enterprise and its staff, as well as psychological knowledge. They had good skills concerning basic functions of management of organisations, such as planning, organising, leading people (motivating) and controlling, as well as ability to recognise and prioritise important issues, negotiating skills or skills to set objectives and methods to achieve them. They were strong at customer focus skills and ensuring high quality of work, while their competencies were lower in human resources management, including especially: ability to create a right workplace for employees⁴⁸, talent management skills, social skills, searching for and finding education options for themselves and their employees or translating corporate objectives to individual employees' goals. Similarly, management staff were weak at such skills as management of "knowledge staff" and knowledge they hold, implementation of organisational culture of a learning, knowledge managing organisation or focus on intangible assets of the organisation.

Management staff had also a marked competency gap concerning skills of application of information and communication techniques and technologies in business, including: information retrieval (e-libraries, data warehouses), e-commerce, distance work and distance learning, management support and teamwork. They were also weaker at achievement of competitive advantage at international markets.

An analysis considering the criterion of management level allowed for diagnosing strengths and weaknesses of Lower Silesian management staff of top and lower levels. It relied on statistically significant differences and trends identified in responses. Top management staff (as compared to medium and low level management staff) was characterised by markedly

⁴⁸ A skill to create a right workplace for employees means that they are able to do what they are best at, they have relevant materials and equipment at their disposition, they know what they are required to do, that the manager takes their opinion into account, appreciates them, trusts them and cares for them, talks to them regularly, enhances their sense of belonging and loyalty.

higher activity, analytical skills, entrepreneurship and rivalry skills, as well as emotional stability. Top level managers had also significantly larger skills in negotiating and customer focus. Their marked weakness lied in knowledge and understanding of problems concerning the enterprise and its staff, as well as the ability to translate corporate objectives to individual employees' goals. Lower level management staff perceived their misadaptation to the knowledge-based economy especially as a competency gap in analytical skills, entrepreneurship and rivalry skills. They were strong at knowledge and understanding of problems concerning the enterprise and its staff, as well as ability to translate corporate objectives to individual employees' goals.

Table 4.23. Key competencies of management staff in the knowledge-based economy according to the respondents' opinions and identified statistically significant differences in competencies between management staff of knowledge-based enterprises listed in rankings vs. management staff of non-knowledge-based enterprises outside rankings

Key competencies of management staff in the knowl- edge-based economy	Management staff of knowledge-based enter- prises listed in rankings		
	Z	S	
Psychological traits			
Openness to experience		X (F, M)	
Emotional stability		X (F, M)	
Analytical skills		X (F, M)	
Emotional intelligence		X (F)	
Low reactivity	X	X(M)	
Diligence		X (F)	
Focus on principles		X (F)	
Rapid reaction	X	X (F, M)	
Intellect / intelligence	X	X (F, M)	
Amicability		X (F)	
Individual approach		X(M)	
Entrepreneurship		X (F, M)	
Striving to perfection – maximalist attitude	X	X (F, M)	
Extraversion	X	X (F)	
Activity	X	X (F, M)	
Knowledge			
Knowledge of economics	X	X (F, M)	
General knowledge		X (F, M)	

Knowledge of problems concerning the enterprise and its staff	X	X (F)
Knowledge of management	X	X (F, M)
Knowledge of trends and forecasts affecting the economy		X (F)
Technical / specialist knowledge		X (M)
Psychological knowledge	X	
Skills		'
Management skills	X	X (F, M)
Ability to focus on intangible assets of the organisation		X (F)
Ability to communicate in a foreign language fluently		X (F, M)
Skills to manage knowledge staff	X	X (F, M)
Customer focus skills		X (F)
Ability to set objectives and methods to achieve them	X	X (F)
Economic skills	X	X (F, M)
Ability to improve productivity	X	X (F)
Ability to translate corporate objectives to individual em-		V (E M)
ployees' goals		X (F, M)
Ability to recognise and prioritise important issues	X	X (F, M)
Ability to create a right workplace for employees	X	X (F, M)
Social skills		X (F, M)
Ability to implement organisational culture of a learning,		X (F)
knowledge managing organisation		Α(1)
Negotiating skills		
Skills related to achievement of a competitive advantage		
at international markets		
Skills to apply information and communication tech-		
niques and technologies		
Skills to find education options for oneself and staff		
Forecasting skills	X	
Talent management skills		
Ability to ensure high quality of work		
D 1 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		

Description: Z – respondents' opinion on significance of the competency in the knowledge-based economy, S – respondents' strength, X – occurrence of significant domination in the significance assigned, F – women's strength, M – men's strength, F, M – strength of both women and men. Empty field shows no statistically significant difference

Source: original analysis of empirical results.

From the point of view of the research objective, it was especially interesting to diagnose the profile of key competencies of the respondent management staff of knowledge-based enterprises listed in rankings of best companies. These competencies are listed in Table 4.23 including: psychological

traits, knowledge, skills in the decreasing sequence from the largest differences. There are also indicated competencies, which were revealed as strengths of women and men. Table 4.23 presents also respondents' opinions on which competency were of greatest importance in the knowledge-based economy⁴⁹.

The need to consider the criterion of sex justified in-depth expansion of the research to include the aspect of competency differences not only between women and men, but also between men in knowledge-based enterprises listed in rankings and men in non-knowledge-based enterprises outside rankings, as well as women in knowledge-based enterprises listed in rankings and women in non-knowledge-based enterprises outside rankings. These differences are shown in Table 4.24.

Therefore, it can be concluded that competencies described in Tables 4.23 and 4.24 are key competencies of management staff in the knowledge-based economy. However, the image of significant differences between sexes in competencies which are a strength in the knowledge-based economy, as presented in the next Table, is not complete, because many differences – even though they are large, have been statistically insignificant. This was due to low number of sample of management staff, especially women who met both the conditions, i.e. employment in knowledge-based enterprises which are listed in rankings at the same time. The detailed comparison of number of respondents in the groups was shown in section 3.3. Despite this inconveniency, it is still worth it to display the differences (Tab. 4.25).

⁴⁹ The listing in Table 4.23 was based on statistically significant differences of 0.1 and Fisher test.

Table 4.24. Key competencies of management staff in the knowledge-based economy according to the respondents' opinions and identified statistically significant differences in competencies between management staff of knowledge-based enterprises listed in rankings vs. management staff of non-knowledge-based enterprises outside rankings considering respondents' sex

Key competencies of management staff in the knowledge-based economy (strengths and significance assigned)	in ki edge- & rai vs. in i know base out	len nowl- based nkings men non- ledge- ed & side kings	in k edge & r ing wo in kn edge & o	omen nowl- -based cank- gs vs. men non- owl- -based utside kings	in ki ed base ranl vs. w in ki ed base	len nowl- ge- ed & kings omen nowl- ge- ed & kings
	Z	S	Z	S	Z	S
Psychologi	cal trai	its				
Openness to experience		X				
Emotional stability		X				
Extraversion		X				
Analytical skills		X				
Individual approach		X				
Focus on principles				X		
Emotional intelligence		X				
Striving to perfection – maximalist attitude	X	X				
Diligence						
Rapid reaction	X	X				
Intellect / intelligence		X				X
Low reactivity	X	X				
Activity			X		X	
Amicability		X				
Rivalry skills						
Entrepreneurship						
Knowl	edge					
Knowledge of management	X	X	X		X	
Knowledge of problems concerning the enterprise and its staff	X	X		X		
Knowledge of trends and forecasts affecting the economy	X	X		X		
Knowledge of economics	X	X		X		

General knowledge	X	X			
Psychological knowledge					
Technical / specialist knowledge					
Skil	ls				
Skills to manage knowledge and knowl-		X			
edge staff		Λ			
Ability to translate corporate objectives to		X			
individual employees' goals		Λ			
Ability to focus on intangible assets		X			
of the organisation		71			
Management skills		X			
Ability to set objectives and methods to		X			
achieve them		Λ			
Skills to apply information and communi-					
cation techniques and technologies					
Skills to find education options for oneself		X			
and staff		2 1			
Ability to implement organisational culture					
of a learning, knowledge managing organi-		X			
sation					
Economic skills					
Ability to create a right workplace for em-					
ployees					
Ability to communicate in a foreign lan-		X			
guage fluently					
Ability to recognise and prioritise impor-		X			
tant issues		W			
Customer focus skills		X			
Ability to improve productivity		X		37	
Social skills		X		X	
Forecasting skills					
Skills related to achievement of a competi-					
tive advantage at international markets					
Talent management skills					
Negotiating skills		<u> </u>			
Marketing skills		X			
Ability to ensure high quality of work					

Description: Z – respondents' opinion on significance of the competency in the knowledge-based economy, S – respondents' strength, X – existence of a significant competitive advantage in men; empty field means no statistically significant differences in responses.

Source: original analysis of empirical results.

Table 4.25. Differences in competencies of respondent management staff at knowledge-based enterprises listed in rankings and non-knowledge enterprises outside rankings considering respondents' sex (proportion difference test).

Key competencies of management staff in the knowledge-based economy (re- spondents' strengths)	Women in knowl- edge-based & rankings vs. women in non- knowledge- based & outside rankings (%)a	Men in knowl- edge- based & rankings vs. men in non- knowl- edge-based & outside rankings (%)b	Men in knowl- edge- based & rankings vs. women in knowl- edge- based & rankings (%)c
Skills to apply information and communication techniques and technologies	-8	18	27
Intellect / intelligence	-3	26	23
Rapid reaction	1	32	22
Social skills	-1	23	18
Striving to perfection – maximalist attitude	2	26	18
Talent management skills	-1	13	18
Ability to recognise and prioritise important issues	0	23	18
Low reactivity	7	31	15
Ability to focus on intangible assets of the organisation	13	33	15
Ability to communicate in a foreign language fluently	12	31	15
Analytical skills	14	27	12
Management skills	20	25	9
Ability to improve productivity	13	23	8
Forecasting skills	7	9	8
Rivalry skills	6	-1	7
Amicability	10	22	7
Ability to create a right workplace for employees	10	16	7
General knowledge	12	31	7
Individual approach	12	21	6
Ability to implement organisational culture of a learning, knowledge managing organisation	3	21	6

Skills to manage knowledge and knowledge staff	17	26	6
Ability to translate corporate objectives to individual employees' goals	7	26	5
Degree of emotional intelligence	12	24	4
Customer focus skills	14	21	4
Marketing skills	14	24	4
Negotiating skills	10	13	1
Technical / specialist knowledge	17	15	1
Entrepreneurship	14	13	0
Activity	12	15	-1
Openness to experience	18	21	-1
Skills related to achievement of a competitive advantage at international markets	18	9	-2
Knowledge of economics	25	37	-3
Emotional stability	20	25	-3
Social skills	22	15	-4
Diligence	15	17	-4
Ability to set objectives and methods to achieve them	14	22	-6
Knowledge of problems concerning the enterprise and its staff	25	29	-6
Knowledge of management	18	25	-6
Psychological knowledge	10	12	-8
Focus on principles	26	17	-11
Knowledge of trends and forecasts affecting the economy	28	14	-12
Ability to ensure high quality of work	16	6	-14
Extraversion	20	9	-20

Description:

Source: original analysis of empirical results.

^a Positive value means that the competency in question is a stronger part of women in knowledge-based enterprises listed in rankings, and the negative value means that women in non-knowledge-based enterprises outside rankings are stronger at that.

^b Positive value means that the competency in question is a stronger part of men in knowledge-based enterprises listed in rankings, and the negative value means that men in non-knowledge-based enterprises outside rankings are stronger at that.

^c Positive value means that the competency in question is a stronger part of men in knowledge-based enterprises listed in rankings, and the negative value means that women in knowledge-based enterprises listed in rankings are stronger at that.

The analysis of differences presented in Tab. 4.25 proves that male managers of knowledge-based enterprises listed in rankings had higher competencies (as compared to female managers in the same group) concerning: application of information and communication techniques and technologies, social skills, recognising and prioritising important issues, focusing on intangible assets of the organisation, talent management and fluent communication in foreign languages. They were stronger at rapid reactions, which means that they react faster to external stimuli, and striving to perfection. They had also stronger analytical skills and lower reactivity. Meanwhile, women in the same group (as compared to men) were more extravert and focused on principles, they had larger knowledge of forecasts and trends affecting economy and greater ability to ensure high quality of work (Tab. 4.25).

Concluding the analyses and comparisons performed, competencies listed in Tables 4.23, 4.24 and 4.25 are desired for management staff in the knowledge-based economy.

Conclusions and postulates

Analysis of the collected data allowed for development of conclusions and fundamental postulates concerning the studied reality in the area of competencies of management staff which are crucial in the knowledge-based economy. They concern especially management staff of enterprises listed in rankings. Their implementation may improve management, make selection of management staff more efficient and make development of the knowledge-based economy faster. They are as follows:

- Only a part of the studied enterprises in Lower Silesia are knowledge-based enterprises (they operate within the knowledge-based economy).
 This confirms the distance between the Polish economy and the average level in the European Union and OECD in this respect. Therefore, it is necessary to undertake more efficient actions to let Lower Silesian enterprises change the traditional methods of management to those which are characteristic for the knowledge-based economy.
- 2. The revealed strong focus of top level management staff on the knowledge-based economy seems a postulate to a certain extent, but still it

- may be an important factor to support positive changes in enterprises and entire economy.
- 3. There are more knowledge-based organisations among enterprises listed in rankings than outside rankings. This shows that the knowledge-based status improves corporate results in contemporary environment.
- 4. The respondents from knowledge-based enterprises listed in rankings have markedly higher competencies as compared to non-knowledge-based enterprises outside rankings in all analysed areas and especially in application of knowledge, innovation, ICT, as well as human capital and its development at enterprises. One may conclude therefore that higher competencies of management staff correspond to modified methods of management and to corporate results above average, which allows the enterprise to reach rankings.
- Out of the five-factor personality theory psychological traits [McCrea, 5. Costa 2005; Siuta 2006], key competencies of management staff in the knowledge-based economy include openness to experience, emotional stability, diligence and extraversion. Among other components of psychological traits, the following were declared as crucial in the knowledge-based economy: intelligence, which responds for efficiency of information processing, efficiency of learning, cognitive strategies, adaptation to the changing environment, rapid recognition, association, flexibility and capacity of thinking, fast rate of intensive and flawless intellectual work, defining of terms, understanding of correlations, perception of analogies and strategic thinking. Among the studied traits of temperament, rapid reaction (to occurring chances) and low reactivity (to disturbances) were revealed crucial. Management staff of knowledge-based enterprises listed in rankings assigns significantly bigger relevance to those competencies in the knowledge-based economy. Therefore, it seems justified to conclude that these competencies should be considered crucial, so the desired competency profile of management staff recruited to modern knowledge-focused enterprise should stress these traits. It seems justified, because management in modern environment requires fast reaction, i.e. short time of reaction to stimuli, as well as low reactivity or low sensitivity to disturbances, high capacity, short

time needed to prepare for work, faster concentration on priority activities, ability to work intensively, at maximal rate, confronting disturbances, noise, emotional difficulties, stress, time pressure or fatigue. In more detailed comparison, analytical skills and entrepreneurship were found key psychological traits in the knowledge-based economy, too. It seems grounded to argue that importance of entrepreneurship in top level managers was mentioned already by H. Mintzberg in his model [Mintzberg 1971], but in the knowledge-based economy, the meaning of this competency has grown significantly.

- 6. Management in the knowledge-based economy requires broader knowledge of different areas from management staff, including knowledge of economics, management, problems concerning the enterprise and its staff, as well as trends and forecasts which affect the economy. To a lesser extent, general knowledge and technical/specialist knowledge are needed.
- 7. Key skills in the knowledge-based economy concern management of human resources: knowledge management skills, creating a right workplace for employees, talent management, social skills, searching for and finding education options for oneself and employees and translating corporate objectives to individual employees' goals. It is equally important to have such skills as customer focus, marketing skills, application of information and communication techniques and technologies, focusing on intangible assets of the company which shape its intellectual capital and skills related to achievement of competitive advantage at international markets.
- 8. There was a gap diagnosed in the respondent management staff's competencies of managing in the knowledge-based economy, regardless of sex, age or level of management, which proves that the management staff is not entirely prepared to work in such environment. Respondents were aware of the fact. The research revealed that in the case of management staff of knowledge-based enterprises listed in rankings the competencies gap was smaller than in the case of management staff of non-knowledge-based enterprises outside rankings, especially concerning competencies which allowed for intensive application of

- knowledge, innovation, ICT in enterprises, as well as human capital and its development. This grounds a conclusion that higher competencies of management staff correspond to development of knowledge-based economy and corporate results. Therefore, management staff's education curricula should be expanded by training to eliminate the revealed competencies gap.
- 9. It turned out that the respondents were overly focused on general knowledge and technical/specialist knowledge, and they were less concentrated on knowledge of management, knowledge of problems which concerned the enterprise and its staff, as well as trends and forecasts affecting the economy. This allows for a conclusion that a part of the Polish management staff still operates within the efficiency-based economy. Knowledge-based economy is a more advanced version of the economic development of countries, where knowledge and its application (innovations) is used to compete instead of cheap labour, low taxes or efficiency.
- 10. The respondent management staff was weaker at application of information and communication technologies, including: information retrieval (internet, e-libraries, data warehouses), e-commerce, distance work and learning, management support (including support of operational processes and decision-making), teamwork and communication. This concerns women especially. Although the respondents were aware of this competencies gap, they didn't assign big significance to this competency. This situation proves that management education system in Poland is insufficient in this respect. Therefore, it is necessary to change curricula so as to enlarge the number of hours devoted to information and communication technologies in management. It is also necessary to stress quality of this education, too, and to relate it to enterprises, which are knowledge-based organisations. This concerns both students and management staff at postgraduate studies.
- 11. The respondents were not enough focused in management on joint interests the enterprise and employees. The knowledge-based economy requires more attention paid to human capital, its needs, shaping and development. Therefore, at recruitment of managers, persons with highest competencies in management of human resources should be selected first.

12. Management staff of knowledge-based enterprises listed in rankings assigned greater significance to talents and talent management⁵⁰ and ass significantly stronger at these competencies. It can be assumed therefore, that this competency is crucial in the knowledge-based economy.

- 13. Lower level management staff was stronger at focusing on issues of human capital and obtaining competitive advantage at international markets. Also, they assigned greater significance in the knowledge-based economy to forecasting and social skills. Especially the latter seem important in the knowledge-based economy, as they are related to application of methods of efficient persuasion and discussion, communication, conflict soothing, leading, initiating and managing change, creating relationships, information sharing and cooperation for common goals. Considering the above, the researcher suggests enhanced involvement of lower level management staff in taking operational, as well as strategic decisions at the enterprise.
- 14. Performance in the knowledge-based economy requires management staff characterised by greater amicability. This trait is evidently women's strength, but as shown by the research male management staff in knowledge-based enterprises listed in rankings had much higher intensity of this trait than their counterparts in non-knowledge-based enterprises outside rankings. It turned out also that knowledge-based economy required management staff of lower intensity of rivalry. This leads to a conclusion that in recruitment of management staff for the knowledge-based economy, more amicable persons should be sought, who exhibit willingness to cooperate, altruistic, frank, helpful, forgiving, agreeable and less rivalry-oriented.
- 15. The performed analysis confirmed that there were differences in competencies which were a strength of management staff in knowledge-based enterprises listed in rankings dependent on sex, and therefore gender diversity is needed in enterprises' management teams.
- 16. Male managers were stronger at rivalry skills, technical/specialist knowledge and skills to focus on intangible assets of the organisation

⁵⁰ Skills to manage talents are defined as an ability to select, attract, involve and maintain the most talented employees.

which comprise its intellectual capital; while female managers were stronger at diligence and amicability. In general one may conclude that enhanced cooperation between in women and men in management in the knowledge-based economy would be right and would allow for using strengths of both sexes.

- 17. Women are much more focused on human resources and they have larger skills to combine corporate objectives with employees' goals. This results in a postulate of increased number of women in management of enterprises, especially at the top level, which may have a positive effect on development of the knowledge-based economy.
- 18. The research revealed that men assessed their intelligence higher than women. Considering results of multiple studies which proved no difference in intelligence between sexes, it seems justified to conclude that in this area women have lower self-assessment. Therefore it seems necessary to offer trainings for women to improve their self-assessment. Those managers who have too low self-assessment and can't evaluate their own strengths, will find it difficult to succeed in the complex environment of knowledge-based economy.
- 19. Men from knowledge-based enterprises listed in rankings hade significantly higher competencies than men of non-knowledge-based enterprises outside rankings in all studied areas. Among women differentiation of knowledge and skills was much lesser. This may lead to several conclusions. Differences of competencies between men in the studied groups (rankings & knowledge-based enterprise vs. non-knowledgebased & outside rankings) were very big in the case of psychological traits, knowledge and skills, while among women differences concerned mainly psychological competencies. This may suggest that women (both in knowledge-based enterprises listed in rankings and non-knowledge-based enterprises outside rankings) were more focused on gaining knowledge and skills than men. Another conclusion suggests that larger knowledge and skills of management staff, without relevant psychological traits, were not enough to ensure positive corporate results in the knowledge-based economy. As shown by the study results, several key psychological competencies are needed to achieve

it, e.g. greater openness to experience, emotional stability, extraversion, emotional intelligence, diligence, amicability and activity. Therefore, on one hand, it seems logical to conclude that these psychological traits are crucial for the knowledge-based economy, and on the other hand it proves that psychological traits are more important than knowledge and skills, which become out-of-date fast, too. The analysis of this results allows also for another conclusion: that women in management positions find it harder to implement changes related to the knowledge-based economy at enterprises, even though they have the relevant knowledge and skills and they are convinced to do it. As confirmed by the research women in non-knowledge based enterprises outside rankings had the necessary knowledge and skills to manage within the knowledge-based economy, but that was not enough to make their enterprises knowledge-based enterprises and let them achieve corporate results included in rankings of the best enterprises.

- 20. As evidenced by the research, sex is a factor of difference of significance assigned to competencies in the knowledge-based economy to some extent. It may also affect selection of candidates to enterprises. Women and men, considering differences in significance assigned, will take it into account and this may lead to suboptimal choices. For instance, a man will select candidates mainly for their technical/specialist knowledge, while a woman for their diligence and focus on principles. In order to avoid such situations, the author suggests a postulate to appoint mixed male and female teams responsible for selection and recruitment, then they would consider the crucial competencies profile in the knowledge-based economy to a greater extent and not only those competencies which are believed important by a single sex.
- 21. Attention should be paid to the identified big significance assigned by respondents in knowledge-based enterprises listed in rankings to knowledge of trends and forecasts which affect the economy. With great variability and unpredictability, they find this knowledge indispensable. Therefore, management staff should constantly monitor development trends and changes which may affect the economy, occurring not only in proximity, but also in Europe and worldwide. This

will help prepare their enterprises to new chances and challenges. It is worth noting, however, that imagining future and predicting events is a difficult task considering complexity and multidisciplinary nature of this issue. Forecasts, strategic documents and expert opinions on future are equivocal. The task is even harder with deficient data and incoherent, variable methodology. The research confirmed that predicting future is rather women's strength. This competencies are crucial especially in adaptation to changes in the environment and in developing long-term business strategies. Therefore, it seems right to set a postulate that the relevant number of women should be ensured in management teams so that their strengths in this area can be used, but also — which is equally important — to make their voice in discussions heard and their influence on decision-making significant.

- 22. It was observed that big significance was assigned in the knowledge-based economy to focus on principles. This is hardly surprising, since such economy is highly competitive, variable and excellently "informed". Information spreads almost immediately, and therefore ethical standards are enforced by customers themselves, competitors, society or media. Results of decisions and operations of management staff are now much larger than previously, so corporate social responsibility has become an equally important value as profit. Besides, it is difficult even to imagine cooperation, knowledge sharing, diffusion of risks and innovative ideas without trust and reliability concerning ethical norms and honesty of management staff. Therefore, management staff of high ethical standards should be sought, living according to invariable values, requiring responsibility and ethical attitude from themselves and from others.
- 23. Analysis of the research held allows for drawing an overall conclusion that nowadays it is necessary to pay greater attention to competencies of management staff and their constant development, because the knowledge-based economy and achievement of good corporate results in the knowledge-based economy depend on competencies of management staff, too.

CHAPTER 5. CORRELATIONS BETWEEN COMPETENCIES OF MANAGEMENT STAFF AND CORPORATE RESULTS OF ENTERPRISES IN THE KNOWLEDGE-BASED

ECONOMY — STUDY RESULTS

The performed empirical exploration allowed also for answering a question what, if any, are the correlations between competencies of management staff and corporate results in the knowledge-based economy. In the preparation phase, a hypothesis was assumed that there were such correlations. It was verified by empirical study on two groups: management staff of knowledgebased enterprises listed in rankings and management staff of non-knowledge-based enterprises outside rankings. To determine the correlation between competencies of management staff in the knowledge-based economy and corporate results several statistical methods were applied so as to make the final results more reliable. The detailed results of the tests which were statistically significant, have been put in the Appendix no. 2, considering the large quantity of data (Tables z2.1 through z2.10), and the present chapter refers only to the most important ones. It is worth remembering that the analysis concerns only those competencies which were found by the respondents important or very important in the knowledge-based economy (Appendix no. 2, Tables z2.2 through z2.10) and those which they declared as their strong or very strong competency (Appendix no. 2, Table z2.1). The correlation between competencies of management staff and corporate results in the knowledge-based economy starts with interpretation of identified correlations between psychological traits.

5.1. Correlations between psychological competencies and corporate results in the knowledge-based economy

The first diagnosis concerned psychological traits, starting from personality traits. The research revealed the strongest correlation with results of enterprises listed in rankings in the case of such competencies of management staff as emotional stability and openness to experience, then diligence and amicability to a lesser extent and finally extraversion in the least, although still statistically significant degree (Tab. 5.1, Fig. 5.1).

Table 5.1. Statistically significant tetrachoric correlations between psychological competencies of respondent management staff and corporate results of knowledge-based enterprises listed in rankings

Key psychological competencies of management staff in the knowledge-based economy (variables)	Correlations, ranking + knowledge- based organisa- tion, strength	Correlations, ranking + knowledge-based organisation, sig- nificance assigned
Emotional stability	0.37	0.21
Openness to experience	0.37	0.22
Analytical skills	0.35	0.23
Emotional intelligence	0.32	
Low reactivity	0.31	0.24
Diligence	0.30	0.26
Focus on principles	0.30	
Rapid reaction	0.29	0.26
Intellect / intelligence	0.28	0.37
Amicability	0.25	none
Individual approach	0.25	none
Entrepreneurship	0.24	none
Striving to perfection – maximalist approach	0.23	0.22
Extraversion	0.21	0.23
Activity	0.21	0.26

Source: original analysis of empirical results.

Correlation between these competencies of management staff and results of knowledge-based enterprises listed in rankings has been confirmed by Cochran-Armitage test, too (Tab. 5.2). A trend was observed that if a respondent manager is strong at emotional stability, then it is almost four times more probable, that this respondent represents a knowledge-based enterprise listed in rankings (statistics = 3.71, p-value = 0.00). For such traits as openness to experience and diligence, the probability increases three times, for amicability – two and a half, and for extraversion – two times (Tab. 5.2).

Table 5.2. Statistically significant correlations between psychological competencies which are respondent management staff's strengths and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of the staff rankings & knowledge-based enterprises)

Key psychological competencies of the respondent management staff	Statistics according to Cochran-Armitage test	p-value
Emotional stability	3.71	0.00
Analytical skills	3.55	0.00
Openness to experience	3.07	0.00
Diligence	3.06	0.00
Focus on principles	2.71	0.01
Rapid reaction	2.69	0.01
Degree of emotional intelligence	2.60	0.01
Amicability	2.41	0.02
Low reactivity	2.28	0.02
Extraversion	2.08	0.04
Striving to perfection – maximalist approach	2.04	0.04
Activity	2.00	0.05

Source: original analysis of empirical results.

The performed chi-square test of independence and precise Fisher test also confirmed existence of strong correlations shown in Table 5.3. The calculated chance quotient revealed that the chance that a manager whose strengths were emotional stability and openness to experience, represented a knowledge-based enterprise listed in rankings, was three times larger than a chance that this person managed a non-knowledge-based enterprise

outside rankings. For diligence this chance was two and a half times larger, and for amicability and extraversion – two times larger (Tab. 5.3).

Table 5.3. Statistically significant correlations between psychological competencies which are respondent management staff's strengths and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of the staff rankings & knowledge-based enterprises)

Key psychological competencies of the respondent management staff	Chi- square statistics	Chi-square p-value, statistics	Fisher test p- value	Chance quo- tient
Emotional stability	8.03	0.00	0.00	3.03
Analytical skills	7.19	0.01	0.00	2.88
Openness to experience	6.80	0.01	0.00	3.20
Low reactivity	6.05	0.01	0.01	2.38
Focus on principles	5.89	0.02	0.02	2.31
Emotional intelligence	5.58	0.02	0.02	2.31
Rapid reaction	5.13	0.02	0.01	2.58
Diligence	4.50	0.03	0.02	2.54
Individual approach	4.08	0.04	0.04	1.99
Amicability	4.00	0.05	0.04	2.05
Intellect / intelligence	3.40	0.07	0.04	2.39
Striving to perfection – maximalist approach	3.23	0.07	0.06	1.89
Entrepreneurship	2.78	0.10	0.08	2.07
Extraversion	2.67	0.10	0.08	1.84

Source: original analysis of empirical results.

This correlations were confirmed by Cochran-Armitage test, chisquare test and precise Fisher test. It was revealed that there was a trend: if a respondent manager's strengths were rapid reaction, activity, high emotional intelligence, focus on principles and striving to perfection, then it was more than two times more probable that this person represented a knowledge-based enterprise listed in rankings. For analytical skills the probability was over three and a half times higher (Tab. 5.3). Therefore, one may conclude that the higher emotional stability, openness to experience, diligence, amicability, extraversion and intelligence, as well as the better rapid

reaction, activity and low reactivity, the more knowledge-based are managed enterprises and the better results they achieve. A similar correlation was identified for such competencies as analytical skills, focus on principles, individual approach, striving to perfection and entrepreneurship.

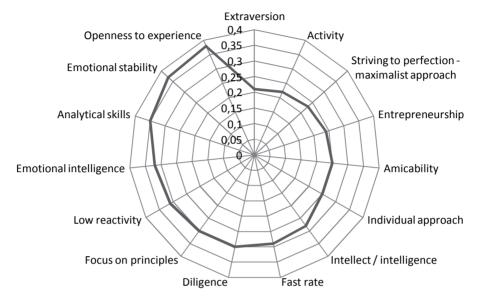


Fig. 5.1. Key psychological competencies in correlation with corporate results of knowledge-based enterprises listed in rankings

Source: original analysis of empirical results.

A similar analysis was performed on correlations between significance assigned by respondents to particular competencies and corporate results of knowledge-based enterprises listed in rankings (Tab. 5.1). It was done in order to identify crucial competencies in the knowledge-based economy, because it was possible that respondents were aware of big significance of certain competencies in the knowledge-based economy, but they were not strong at those competencies. It was valuable to determine which competencies were perceived as the most important in the knowledge-based economy, because it was sure to affect selection of education areas, development of oneself and staff or selection of staff at their enterprises.

The analysis of tetrachoric correlations confirmed that the greater significance assigned by management staff to intelligence, diligence, activity, low reactivity, extraversion, analytical skills, openness to experience, striving to perfection and emotional stability in the knowledge-based economy, the greater extent of knowledge application in their enterprises and the better corporate results (Tab. 5.1). The calculated chance quotient revealed that a chance that a manager who assigned greater significance in the knowledge-based economy to diligence, rapid reactions, activity, low reactivity, extraversion and striving to perfection represented a knowledge-based enterprise listed in rankings was twice as high as a chance that this respondent represented a non-knowledge-based enterprise outside rankings. Considering significance assigned to intelligence the chance is four times higher for a knowledge-based enterprise listed in rankings (Appendix no. 2, Tab. z2.3).

This correlation was confirmed by results of Cochran-Armitage test, too (Appendix no. 2., Tab. z.2.3).

Considering the identified and described psychological traits in correlation with corporate results in the knowledge-based economy, it is worth noting that the respondents assigned too high significance to intelligence in the knowledge-based economy (although it is undoubtedly a key competency), and too little significance to emotional stability, openness to experience and entrepreneurship.

The discussed research results may be concluded with a statement that the stronger management staff is at emotional stability, openness to experience, analytical skills, intelligence, including emotional intelligence, diligence, focus on principles, rapid reaction, amicability, individual approach, entrepreneurship, striving to perfection, activity, extraversion and the lower their reactivity, the better results are achieved by their enterprises in the knowledge-based economy.

5.2. Knowledge of management staff vs. corporate results in the knowledge-based economy

Considering key knowledge of management staff in the knowledge-based and its correlations with corporate results, the research revealed several correlations. The strongest correlations were identified in the case of areas of knowledge specified in Table 5.4.

Table 5.4. Statistically significant tetrachoric correlations between key knowledge of respondent management staff and corporate results of knowledge-based enterprises listed in rankings

Key knowledge of management staff in the knowledge-based economy	Correlations, ranking + knowledge- based organisation, strength	Correlations, ranking + knowledge-based organisation, sig- nificance assigned
Knowledge of economics	0.48	0.50
General knowledge	0.44	0.21
Knowledge of problems concerning the enterprise and its staff	0.42	0.34
Knowledge of management	0.36	0.46
Knowledge of trends and forecasts affecting the economy	0.29	none
Specialist knowledge	0.28	none
Knowledge of psychology	none	0.25

Source: original analysis of empirical results.

These results can be concluded as follows. The broader knowledge held by management staff: of economics, general knowledge, concerning problems of the enterprise and its staff, of management, concerning trends and forecasts which affect economy and technical/specialist knowledge, the more knowledge-based the enterprises are and the better results they achieve to be listed in rankings of the best enterprises (Fig. 5.2).

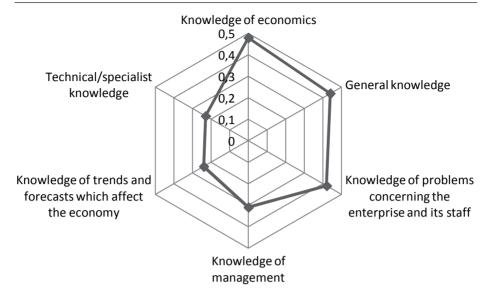


Fig. 5.2. Key knowledge of management staff in correlation with corporate results of knowledge-based enterprises listed in rankings

Source: original analysis of empirical results.

This correlation was also confirmed by the performed Cochran-Armitage test, which revealed a trend that if a respondent manager was strong at knowledge of economics, then it was four times more probable that this manager represented a knowledge-based enterprise listed in rankings. For knowledge of management and knowledge of trends and forecasts which affect economy, the probability was three times higher for this group (Tab. 5.5).

Correlations between knowledge of management staff and corporate results was shown also by the performed chi-square and Fisher tests. The calculated chance quotient showed that a chance that a manager who was strong at general knowledge and knowledge of economics represented a knowledge-based enterprise listed in rankings was four times higher than a chance that this person represented a non-knowledge-based enterprise outside rankings. In the case of knowledge of problems which concern the enterprise and its staff, the chance was three and a half times larger, while for knowledge of trends and forecasts which affect economy and technical / specialist knowledge – more than two times higher (Tab. 5.6).

Table 5.5. Statistically significant correlations between knowledge which is respondent management staff's strength and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of the staff rankings & knowledge-based enterprises)

Key knowledge of management staff in the knowledge-based economy	Statistics accord- ing to Cochran- Armitage test	p-value
Knowledge of economics	4.36	0.00
General knowledge	3.64	0.00
Knowledge of management	3.06	0.00
Knowledge of trends and forecasts	2.95	0.00
Knowledge of problems concerning the enterprise and its staff	2.43	0.01
Specialist knowledge	1.98	0.05

Source: original analysis of empirical results.

Table 5.6. Statistically significant correlations between knowledge which is respondent management staff's strength and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of the staff rankings & knowledge-based enterprises)

Key knowledge of management staff in the knowledge-based economy	Chi- square statistics	Chi-square p-value, statistics	Fisher test p- value	Chance quo- tient
Knowledge of economics	15.56	0.00	0.00	4.42
General knowledge	9.17	0.00	0.00	4.42
Knowledge of problems concerning the enterprise and its staff	11.12	0.00	0.00	3.49
Knowledge of management	7.66	0.01	0.00	2.88
Technical / specialist knowledge	3.92	0.05	0.04	2.33
Knowledge of trends and forecasts which affect economy	5.45	0.02	0.02	2.31

Source: original analysis of empirical results.

Another variable diagnosed in the research concerned significance assigned by respondents to particular areas of knowledge which is crucial in the knowledge-based economy. The analysis of correlations between the assigned significance and corporate results of enterprises listed in rank-

ings in the knowledge-based economy revealed that it was a necessary condition to assign additionally big or very big significance to general knowledge and the knowledge of economics (Tab. 5.4). The above correlations were confirmed by the performed Cochran-Armitage test (Appendix no. 2, Tab. z2.6), chi-square and Fisher tests (Appendix no. 2, Tab. z2.7).

For instance, Cochran-Armitage test revealed a tendency (trend) that assignment of greater significance in the knowledge-based economy to the knowledge of economics was four times more probable in the case of respondents from knowledge-based enterprises listed in rankings than in the case of respondents from non-knowledge-based enterprises outside rankings (statistics = 3.87; p-value = 0.00) (Appendix no. 2, Tab. z2.4). The calculated chance quotient revealed that a chance that a respondent who declared knowledge of economics important or very important in the knowledge-based economy represented a knowledge-based enterprise listed in rankings was more than six time higher than a chance that this respondent represented a non-knowledge-based enterprise outside rankings (chance quotient = 6.19; p-value = 0.00). In the case of knowledge of management, the chance was over five times larger (chance quotient = 5.04; p-value = 0.00) and in the case of knowledge of problems concerning the enterprise and its staff – more than three times higher (chance quotient – 2.91; p-value = 0.01) (Appendix no. 2, Tab. z2.4).

These results, therefore, are grounds for a conclusion that knowledge of management staff, as well as significance assigned to it are in significant correlation with corporate results in the knowledge-based economy. As shown by the research, some areas of knowledge have stronger correlations with corporate results in the knowledge-based economy. Knowledge of economics and general knowledge have turned out to be crucial, along with knowledge of problems concerning the enterprise and its staff, knowledge of management, technical/specialist knowledge and knowledge of trends and forecasts which affect economy.

5.3. Correlations between management staff's skills and corporate results in the knowledge-based economy

A correlation has been revealed between competencies of the respondent management staff and corporate results in the knowledge-based economy (Tab. 5.7).

Table 5.7. Statistically significant tetrachoric correlations between key skills of the respondent management staff and corporate results of knowledge-based enterprises listed in rankings

Key skills of management staff in the knowl- edge-based economy	Correlations, ranking + knowledge- based or- ganisation, strength	Correlations, ranking + knowledge- based organi- sation, signifi- cance assigned
Management skills	0.38	0.36
Ability to focus on intangible assets of the organisation	0.37	none
Ability to communicate fluently in a foreign language	0.35	0.24
Knowledge management skills	0.33	0.28
Customer focus skills	0.32	none
Ability to set objectives and methods to achieve them	0.30	0.39
Marketing skills	0.29	0.28
Ability to improve productivity	0.29	0.35
Ability to translate corporate objectives to individual employees' goals	0.26	
Ability to recognise and prioritise important issues	0.21	0.35
Ability to create a right workplace for employees	0.20	0.27
Social skills	0.20	0.27
Ability to implement an organisational culture of a learning, knowledge managing organisation	0.19	none
Talent management skills	none	none
Skills to apply information and communication techniques and technologies	none	none
Forecasting skills	none	0.26
Skills to search for and find education options for oneself and staff	none	none

Negotiating skills	none	none
Ability to ensure high quality of work	none	0.25
Skills related to achievement of a competitive	none	none
advantage at international markets	none	none

Source: original analysis of empirical results

The observed correlations allow for the following conclusion. The higher skills of management staff in management, focusing on intangible assets of the organisation, fluent communication in a foreign language, management of knowledge staff and their knowledge, customer focus, setting objectives and methods to achieve them, marketing, improving productivity, translating corporate objectives to individual employees' goals, recognizing and prioritising important issues, social skills and ability to implement organisational culture of a learning, knowledge managing organisation, the more enterprises they manage are knowledge-based and they achieve results to be included in the rankings of the best enterprises (Fig. 5.3).



Fig. 5.3. Key skills in correlation with corporate results of knowledge-based enterprises listed in rankings

Source: original analysis of empirical results.

The identified correlations were confirmed by Cochran-Armitage test, which revealed a tendency (trend) that if a respondent was strong at: management skills, including management of knowledge and knowledge staff, focusing on intangible assets of the organisation, setting objectives and methods to achieve them, fluent communication in a foreign language and creating a right workplace for employees, then the probability increased three times that this respondent represented a knowledge-based enterprise listed in rankings.

Table 5.8. Statistically significant correlations between skills which are respondent management staff's strengths and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of the staff rankings & knowledge-based enterprises vs. non-knowledge-based & outside rankings)

Key skills of management staff in the knowl- edge-based economy	Statistics according to Cochran- Armitage test	p- value	Sig- nifi- cant?
Ability to focus on intangible values of the organisation	3.44	0.00	yes
Management skills	3.32	0.00	yes
Skills to manage knowledge staff and the knowledge they hold	3.29	0.00	yes
Ability to set objectives and methods to achieve them	3.19	0.00	yes
Ability to communicate fluently in a foreign language	2.94	0.00	yes
Ability to create a right work place for employees	2.90	0.00	yes
Marketing skills	2.55	0.01	yes
Ability to ensure high quality of work	2.45	0.01	yes
Ability to translate corporate objectives to individual employees' goals	2.25	0.02	yes
Ability to search for and find education options for oneself and staff	2.23	0.03	yes
Skills to apply information and communication techniques and technologies	2.07	0.04	yes
Ability to recognise and prioritise important issues	2.01	0.04	yes
Social skills	1.95	0.05	yes
Forecasting skills	1.82	0.07	yes
Negotiating skills	1.79	0.07	yes
Skills related to achievement of a competitive advantage at international markets	1.76	0.08	yes

Ability to implement an organisational culture of a learning, knowledge managing organisation	1.73	0.08	yes
Skills to improve productivity	1.65	0.10	yes

Source: original analysis of empirical results.

Thus, it was confirmed that if competencies listed in Table 5.8 were respondents' strength, then it was two or three times more probable that they represented knowledge-based enterprises listed in rankings (Tab. 5.9).

The calculated chance quotient revealed that a chance that a respondent who was strong or very strong at skills to manage knowledge and knowledge staff, focus on intangible assets of the organisation and customer, communicate fluently in a foreign language, represented a knowledge-based enterprise listed in rankings, was three times higher than that this persons represented a non-knowledge-based enterprise outside rankings.

Table 5.9. Statistically significant correlations between skills which are respondent management staff's strengths and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of the staff rankings & knowledge-based enterprises)

Key skills of management staff in the knowledge-based economy	Chi- square statistics	Chi-square p-value, statistics	Fisher test p- value	Chance quo- tient
Management skills	7.92	0.00	0.00	3.14
Ability to focus on intangible values of the organisation	8.57	0.00	0.00	2.89
Ability to communicate fluently in a foreign language	7.70	0.01	0.00	2.82
Customer focus skills	5.20	0.02	0.01	2.70
Skills to manage knowledge staff and the knowledge they hold	7.18	0.01	0.01	2.61
Ability to set objectives and methods to achieve them	5.36	0.02	0.02	2.37
Marketing skills	5.45	0.02	0.02	2.31
Skills to improve productivity	5.00	0.03	0.02	2.27
Ability to translate corporate objectives to individual employees' goals	4.24	0.04	0.04	2.05
Ability to recognise and prioritise important issues	2.34	0.13	0.10	1.82

Source: original analysis of empirical results.

There was also performed an analysis of correlations between significance assigned to particular competencies in the knowledge-based economy and rankings (Tab. 5.7). It turned out that the greater significance assigned by respondents to skills to set objectives and methods to achieve them, to recognise and prioritise important issues, to manage knowledge staff and their knowledge, to improve productivity, to create a right workplace for employees, social skills, forecasting skills, ability to ensure high quality of work and marketing skills, the more knowledge-based enterprises they managed were and the more frequently they achieved results permitting for inclusion in rankings of the best enterprises.

The analysis of correlations identified in Table 5.7 indicates that management staff's skills as well as significance assigned to them, are significantly correlated with corporate results in the knowledge-based economy. The correlations are stronger in the latter case. It was revealed that some skills are more strongly correlated with corporate results in the knowledge-based economy. They include: customer focus skills, fluent communication in a foreign language, focusing on intangible assets of the organisation and improvement of productivity.

These results were confirmed by the performed tests, too: Cochran-Armitage test (Appendix no. 2, Tab. z2.6), chi-square test of independence and Fisher test (Appendix no. 2, Tab. z2.7).

The presented data permit therefore a conclusion that the stronger management staff is at skills listed in Table 5.7, the more knowledge-based enterprises they manage are and the more frequently the enterprise achieve corporate results to be included in rankings of the best enterprises.

5.4. Comparison of main results and conclusions

The effect of the analysis of correlations between management staff's competencies and corporate results of enterprises listed in rankings in the knowledge-based economy is shown in Table 5.10. The recognised differences between sexes concerning management in the knowledge-based economy developed in previous chapters allowed for determination which competencies were characteristic for women or men (Tab. 5.10).

The complete listing of statistically significant differences concerning key competencies of management staff in the knowledge-based economy which are strengths of particular sexes, considering level of management, knowledge application and corporate results are shown in Tables z2.8, z2.9 and z2.10 in Appendix no. 2.

Table 5.10. Management staff's skills which correlate strongly with corporate results of knowledge-based enterprises listed in rankings, considering the criterion of sex

Key competencies of manage-	Knowledge-based enterprise & rankings		Strength of particu- lar sexes, based on research in groups:			
ment staff in the knowledge-based economy	signifi- cance	strength	entire population, top level, rankings & knowledge-based			
Psychological traits						
Openness to experience	X	X	female/male			
Emotional stability	X	X	female/male			
Analytical skills	X	X	female/male			
Emotional intelligence		X	female			
Low reactivity	X	X	female/male			
Diligence	X	X	female			
Focus on principles		X	female/male			
Rapid reaction	X	X	female/male			
Intellect / intelligence	X	X	female/male			
Amicability		X	female			
Individual approach		X	female/male			
Entrepreneurship		X	female/male			
Striving to perfection	X	X	female/male			
Extraversion	X	X	female/male			
Activity	X	X	female/male			
Rivalry skills			male			
Knowledge						
Knowledge of economics	X	X	female/male			
General knowledge	X	X	female/male			
Knowledge of problems concerning the enterprise and its staff	X	X	female			
Knowledge of management	X	X	female/male			
Knowledge of trends and forecasts which affect economy		X	female/male			
Technical / specialist knowledge		X	male			
Knowledge of psychology	X		female			

Skills					
Management skills	X	X	female/male		
Ability to focus on intangible assets of the organisation		X	female/male		
Ability to communicate fluently in a foreign language	X	X	female/male		
Knowledge staff management skills	X	X	female/male		
Customer focus skills		X	female		
Ability to set objectives and methods to achieve them	X	X	female		
Economic skills	X	X	female/male		
Skills to improve productivity	X	X	female		
Ability to translate corporate objectives to individual employees' goals		X	female/male		
Ability to recognise and prioritise important issues	X	X	female/male		
Ability to create a right workplace for employees	X	X	female/male		
Social skills	X	X	female/male		
Ability to implement an organisational culture of a learning, knowledge managing organisation		X	female		
Negotiating skills			female/male		
Skills related to achievement of a competitive advantage at international markets			female/male		
Skills to apply information and communication techniques and technologies			male		
Skills to search for and find education options for oneself and staff			female/male		
Forecasting skills	X		female/male		
Talent management skills			male		
Ability to ensure high quality of work	X		female		

Source: original analysis of empirical results.

Concluding the presentation of competencies which correlate with corporate results of enterprises listed in rankings in the knowledge-based economy, the general conclusions may be developed concerning the identified correlations:

- 1. Corporate results of enterprises listed in rankings in the knowledge-based economy correlate the most strongly with such competencies of management staff as: knowledge of economics, knowledge of problems concerning the enterprise and its staff, management skills, ability to focus on intangible assets of the enterprise, fluent communication in a foreign language, analytical skills, ability to manage knowledge and knowledge staff, customer focus skills, high emotional intelligence, low reactivity, diligence and focus on principles, skills to set objectives and methods to achieve them, knowledge of trends and forecasts which affect economy, marketing skills, rapid reaction, ability to improve productivity, intelligence, translating corporate objectives to individual employees' goals.
- 2. There is an especially strong correlation between knowledge-based economy and intensity of extraversion in management staff. Therefore, it is necessary to pay greater attention to the way of motivating these persons. Extraverts are characterised by higher sensitivity to existence of awards and penalties and they need much more stimuli to achieve the required level of activity. They also need broader autonomy. Motivation system for management staff in enterprise which shape knowledge-based economy should include those preferences, focusing mainly on awards and avoiding penalties. Then, motivation systems will be the most efficient.
- 3. Among psychological traits which were not required in non-knowledge-based economy and which were defined as crucial in the knowledge-based economy, one may list amicability. It corresponds to helpfulness, willingness to forgive, good predisposition, frankness, trust, altruism, compliance, modesty, delicacy, generosity and manifested willingness to cooperate. The situation is similar in the case of focus on principles. A principle-focused person lives by unchangeable values, they require high level of responsibility and ethics from themselves and others, they are reliable and can be trusted, they work hard if the work's objective is in line with the values. This leads to a final conclusion that achievement of good results in the knowledge-based

economy requires more amicable and principle-focused management staff who are less focused on dominance and rivalry.

- 4. With respect to knowledge, key areas for corporate results in the knowledge-based economy were revealed to be knowledge of economics, knowledge of trends and forecasts which affect economy and knowledge of problems concerning the enterprise and its staff. High significance of technical / specialist knowledge, characteristic for non-knowledge-based enterprises, has been markedly reduced.
- 5. More attention should be paid to recruitment of management staff and their selection based on key competencies in correlation with corporate results of enterprises listed in rankings in the knowledge-based economy. Training schemes should be prepared to develop these competencies.
- 6. Academic curricula for management staff should be expanded by training to improve competencies which correlate with corporate results of knowledge-based enterprises listed in rankings.
- 7. Competencies which correlate with corporate results of enterprises listed in rankings in the knowledge-based economy include men's strengths and women's strengths. Therefore it seems justified to conclude that the knowledge-based economy requires a new model of management based on cooperation of women and men.

CHAPTER 6. CHANGES IN COMPETENCIES OF MANAGEMENT STAFF TOWARD THE KNOWLEDGE-BASED ECONOMY

6.1. Model of key competencies of management staff in the knowledge-based economy and their correlations with corporate results of enterprises listed in rankings

One of the requirements concerning models is the necessity to reconcile simplicity and universal nature on one hand and consideration of the maximal potential number of features to characterise the economic reality described by the model. A model in social sciences "is defined as an abstract presentation of reality so as to order and simplify our approach to the reality in question by recreating its basic characteristics" [Frankfort-Nachmias, Nachmias 2001, p. 59]. Development of a postulated model usually requires creative application of literature studies, empirical results and the researcher's own reflections. However, the author will base her model primarily on the two latter sources because in the scientific literature virtually no documented correlations were found between competencies of management staff and corporate results of enterprises listed in rankings in the knowledge-based economy. Development of the model was an effect of search for an answer to the question: which competencies of management staff are crucial in the knowledge-based economy and what are their correlations with corporate results? The model's components were on significant correlations between competencies of management staff and corporate results of knowledge-based enterprises listed in rankings, as identified in the empirical research. They will be described in this section. Before presentation of the model, one more issue should be stressed. With so large variability of enterprises' environment, as observed nowadays, it is difficult to

define a single group of the only and universal set of key competencies of management staff which correlate with corporate results. However, a model should be sought which can be based on proved, widely accepted elements and at the same time which may offer a proposed solution to synthesise a new approach characteristic for the knowledge-based economy. The following assumptions were applied in development of the model:

- 1. It was assumed that competencies of management staff can be self-recognised and correctly self-assessed to a very large extent [Cattell 1957; McCrae, Costa 2005; 2008; Drucker 1999a].
- 2. A feature in the model describes not only a specific behavioural tendency, but also a predisposition for particular type of behaviour and it may imply or include a motive [Pervin 1994, p. 103-113]. With this approach, it is non-contextual, meaning that the features develop and manifest in a way that is largely determined biologically and the environment plays a lesser role in their formation [Strelau 2002; 2006].
- It was assumed that criteria used at creating rankings may be different, provided that they include corporate results presented in financial statements according to the Act on Accounting (Journal of Laws of 1994 no. 121, item 591).
- 4. All enterprises in rankings have positive corporate capital and have achieved a net profit in the studied year and the year before. The position of the enterprise in the rankings was not included in the performed analysis. It was assumed that if enterprises were listed in rankings, it meant that they had achieved better results than other enterprises which were not included in those rankings.

The presentation of the model starts with description of its main components, as well as correlations within it. The central place in the model is taken by the knowledge-based economy. The variety of interpretations of this term is very rich and has been discussed in section 1.3. In the model the knowledge-based economy was defined as an economy where knowledge was created, learned, diffused and used more effectively by enterprises which relied on it in their competitive advantage. Another component of the model involves knowledge-based enterprises listed in rankings. These are enterprises which were included in rankings because they had achieved better results than enterprises outside these rankings. At the same time, they were knowledge-based

enterprises where knowledge is created, learned, diffused and used more effectively and it was what the organisations relied on in their competitive advantage⁵¹. Results of the enterprises in the model are defined as results presented in financial statements (unit and consolidated statements)⁵², according to chapter 5 of the Act on Accounting (Journal of Laws of 1994 no. 121, item 591) and art. 3 section 1 points 12, 20, 30, 31, which introduce definitions of the basic economic categories to be included in financial statements. They concern the achieved revenues, dynamics of sales revenues (%) in the year in question as compared to the year before, net financial result (for capital groups: sum of net results attributed to shareholders of the dominant entity and net results of minority shareholders), assets and capital (at the end of the year), export, investments (purchase of intangible and legal assets or tangible assets), employment (average employment in the year in question) and indicators to describe efficiency, such as: return on equity, net profitability, EBIDTA margin⁵³, dynamics of revenues per one person employed, return on equity and assets, stability and development potential, i.e. revenue growth, intensity of investments and export share in sales, as well as level of expenses on investments.

The main place in the model is taken by key competencies of management staff. They are defined as psychological traits, knowledge and skills⁵⁴, which are important or very important in management in the knowledge-based economy. A manager's knowledge in the model involves awareness of technical production issues, organisational issues, economics and social issues, as well as problems of the entity in question and conditions of its operations (closer and further environment) [Chełpa 2003, p. 51]. In the model it was assumed that psychological traits and knowledge were reflected in the manager's profes-

⁵¹ The definition was developed based on the definitions of the knowledge-based economy as suggested by the OECD and World Bank [OECD 2000] and by A.K. Koźmińskiego [2001].

⁵² Financial statements present enterprises' financial results according to the rules of accounting. Currently, they are the main source of information about the financial condition of enterprises and they make it possible to set financial information in order and analyse swiftly data concerning the business entity in question. They meet certain quality norms and they are reliable, verifiable, prompt and continuous.

⁵³ EBIDTA: an indicator in accounting which reflects earnings before interest, taxes, depreciation and amortisation.

⁵⁴ The method of defining such terms as psychological traits, knowledge and skills, as well as the description of their components applied in the research and in the book, was presented at the end of section 1.1.

sional behaviour – skills [Chełpa 2003, p. 51]. Management staff is defined in the model as the population of enterprise's employees who manage particular entities or organisational units. These are person who lead organisational units (teams) by ensuring implementation of tasks assigned to them and having these tasks implemented by their subordinates [Listwan 2005, p. 56].

In the model, in the groups of competencies, at the bottom of the pyramid, there are competencies which correlate the most strongly with corporate results of knowledge-based enterprises listed in rankings. The higher a competency lies in the pyramid, the lower its meaning for corporate results. For instance in the group of psychological competencies, emotional stability⁵⁵ is located at the lowest level, which means the higher level of emotional stability of the management staff, the better results are achieved by enterprises they manage. The further sequence of psychological traits with the strongest correlation with corporate results in the knowledge-based economy includes: openness to experience⁵⁶, analytical skills⁵⁷, emotional intelligence⁵⁸, low reactivity⁵⁹, focus on principles⁶⁰, diligence⁶¹, fastness⁶², intelligence⁶³, indi-

⁵⁵ In the model emotional stability signifies that a person characterised by this trait controls their emotions, they are composed, confident, stress-resistant and realistic in thinking.

⁵⁶ In the model openness to experience is defined as high level of imagination, searching for new experience and things, tolerating change, creativity, innovativeness, broad-mindedness and broad interests, phantasy, originality, culture, aesthetics, emotionality, having ideals, focus on learning, openness to new values.

⁵⁷ In the model, analytical skills are characteristic for a logical person of disciplined mind, who is able to search for data to construct schemes and correlations between them, a person who reaches to very point of a fact or reason.

⁵⁸ Emotional intelligence: self-awareness (recognising one's emotions, correct self-assessment, self-confidence), self-control, motivation, ability to understand situations and reactions of team members, empathy, creating good relations with other people.

⁵⁹ In the model, low reactivity is defined as low sensitivity to disturbances, short phase of preparation for work, fast concentration on fundamental issues, ability to work intensively, at the maximal rate when facing disturbances, noise, emotional difficulties, strong stress, time pressure or fatigue.

⁶⁰ Focus on principles is characteristic for a person who lives by unchangeable and fundamental values, requires high responsibility and ethics from themselves and others, a person who can be trusted and who is reliable, who is hard-working if the work's objective is consistent with their values.

⁶¹ In the model, diligence is defined as being organised, tendency to order, precision, efficiency, responsibility, ambition, consistence, self-discipline, dutifulness, striving for achievements, autonomy in setting and achieving objectives, reason, order, conscientiousness, practical approach.

⁶² In the model, fastness is defined as short time of reaction to stimuli.

⁶³ In the model, intellect/intelligence is defined as efficiency of information processing, efficiency of learning, cognitive strategies, adaptation to the changing environment, rapid recognition, association, flexibility and capacity of thinking, fast rate of intensive and flawless intellectual work,

vidual approach⁶⁴, amicability⁶⁵, entrepreneurship⁶⁶, striving to perfection⁶⁷, activity⁶⁸ and extraversion⁶⁹ (Fig. 6.1). At the bottom of the pyramid in the model, there are competencies which correlate the most strongly with corporate results of knowledge-based enterprises listed in rankings. The lower in the pyramid a competency is located, the larger its correlation with corporate results of knowledge-based enterprises listed in rankings.

In the model the strongest correlations with corporate results in the knowledge-based economy are revealed by such areas of management knowledge as: knowledge of economics, then general knowledge and knowledge and understanding of problems concerning the enterprise and its staff.

Further, there are knowledge of management, knowledge of trends and forecasts which affect the economy and specialist knowledge⁷⁰ (Fig. 6.1).

The last, although largest group of management competencies which correlate strongly with corporate results in the knowledge-based economy are skills. The strongest correlations were found in the case of ability to focus on intangible assets of the organisation, fluent communication in foreign languages, skills to manage knowledge and knowledge staff, customer focus skills.

defining of terms, understanding of correlations, perception of analogies and strategic thinking. Intelligence and intellect are treated as synonyms, although they only similar meaning.

⁶⁴ A person who holds this competency is a person for whom uniqueness is the most intriguing; who captures intelligently all that is exceptional and outstanding in people; who knows what will satisfy another person, what are other persons' strengths and needs, what other person is best at; who can select an efficient team.

⁶⁵ UIn the model, amicability is defined as helpfulness, willingness to forgive, good predisposition, frankness, trust, altruism, compliance, modesty, delicacy, manifested willingness to cooperate and generosity.

⁶⁶ Entrepreneurship means acting which consists in creative, innovative undertaking and solving the occurring problems, perception and skilful application of opportunities which appear and flexible adaptation to the changing conditions in the environment.

⁶⁷ Striving to perfection (maximalist approach) is characteristic for a person who is interested in achieving perfection by applying what is already good; they are fascinated by talents, strengths, capabilities; they are focused on strengths and not weaknesses; they choose what is exceptional and not the common.

⁶⁸ Activity is high level of energy, fast moves, quick undertaking of tasks and decision-making, facility in taking risks and new responsibilities, impulsiveness.

⁶⁹ In the model, extraversion is defined as openness to others and tendency to optimism and positive emotional approach to the world, activity, willingness to talk, sociability, cordiality, searching for new experience, interest in the world, leadership attitude.

⁷⁰ Specialist knowledge, i.e. knowledge related to the subject of operations of the enterprise, the industry, conditions of its functioning, market of the enterprise's operations, customers' needs etc.

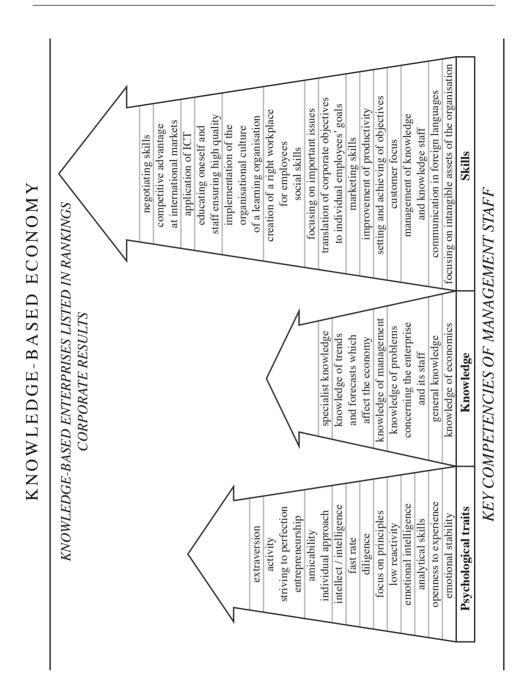


Fig. 6.1. Model of key management competencies in the knowledge-based economy and their correlations with corporate results of enterprises listed in rankings Source: original development.

Then, there were skills to set and achieve objectives, improvement of productivity, marketing skills, ability to translate corporate objectives to individual employees' goals, focusing on important issued and social skills. Key skills include also the ability to create a right workplace for employees⁷¹, implementation of an organisational culture of a learning organisation, talent and quality management, application of ICT⁷² and achievement of a competitive advantage at international markets.

The offered model of correlations (Fig. 6.1) is a recommendation for recruitment departments which want to employ management staff who will achieve such results in the knowledge-based economy which will allow for inclusion in rankings of the best enterprises. It may also serve for training departments at enterprises, as well as universities and other institutions which train management staff.

6.2. Competencies of management staff from planned economy through market economy through knowledge-based economy

In the search for and discussion about key competencies of management staff it is cognitively valuable to diagnose what, if any, changes occurred in those competencies in the temporal perspective from the planned economy through market economy through knowledge-based economy. It is valuable to determine which competencies are universal and which are specific for the particular type of economy. Before commencement of the analysis, it is necessary to present characteristic features of the mentioned types of economy. Planned (command and control) economy will be considered here as an economy based on multiannual plans which defined the crucial objectives of the state's development. In such economy, a team of economists prepared a multiannual economic plan in accordance to the state-defined

⁷¹ In the model, ability to shape the right workplace for employees is defined as skills to allow them to do what they are best at, providing the right materials and equipment, letting them know what they are supposed to do and that the manager takes their opinions into account, appreciates them and trusts them, that the manager cares about them, talks to them regularly, enhances their loyalty and commitment.

⁷² ICT means information and communication technologies.

assumptions. The plan included all information on what goods would be produced, what quantities of them and who should receive them. Prices of particular products were centrally defined, too. This book analyses functioning of such economy between 1950 and 1989. Market economy is defined here as a type of economy where decisions concerning the range and methods of production are taken by economic entities (households, farms, enterprises, financial institutions, government) according to their own interests and these entities operate according to principles of rational management. The decisions are based on information received from the market, e.g. prices of goods and services, prices of factors of production, salaries, interest rates, profit rates, value of securities, currency exchange rates and expectations of business entities concerning future levels of these indicators. The analyses concern functioning of such economy between 1990 and 2000. Knowledge-based economy is defined, as it has been described in section 1.2, as an economy where knowledge is created, learned, diffused and used more effectively by enterprises which rely on it in their competitive advantage. The analysis conventionally concerns the period of functioning of this economy after 2001, taking into account the limitations of this economy in Poland, discussed in section 1.3.

The performed analysis concerning changes of management competencies in the period from planned economy through market economy through knowledge-based economy brings the first reflection. Despite very many published opinions on this subject, there is a visible dominance of theoretical research over empirical studies. In the latter, large variability of terminology and methods is noted. Studies concern management staff of different levels, representing enterprises of various sizes, industries, capital structure. The research covered different ranges of management competencies.

Research expanding in time from planned economy through market economy through knowledge-based economy are missing – long-term studies on the same study group would be very valuable. As there are no such analyses, it is very difficult to draw correct conclusions and to determine the evolution of management competencies. It is worth noting that there are fewer comparisons of changes in management competencies in the time of planned economy and market economy, among which one may list works

by B. Wawrzyniak [1998, p. 87] and S. Chełpa [2003]. However, comparisons of changing management competencies from planned economy through market economy through knowledge-based economy are missing.

In spite of the mentioned objections, the issue is worth analysing to try to capture changes in key management competencies which occurred in the context of changing economic and political conditions between 1950 and 2013, as captured in studies published in the available literature. The analysis allows for a conclusion that among competencies of management staff, in the perspective from planned economy through market economy through knowledge-based economy, there may be found competencies which have not changed, as well as such which have changed markedly. The latter are more numerous.

Competency which seems not to have changed in the analysed period is emotional stability (lack of neuroticism)⁷³. It was characteristic for managers of the planned economy [Obuchowski 1985; Błaszczyk 1999], and for managers in the market economy, too [Chełpa, Listwan 1996; Rakowska, Sitko-Lutek 2000; Dąbek 2001]. No change in the area of this competency from the planned economy to the market economy has been revealed by research by S. Chełpa [2003, p. 255]. It is also characteristic for management staff in the knowledge-based economy [Sikorski 2006, p. 95; Kupczyk 2009e;], as confirmed also by the original empirical research presented in the third and fourth chapter of this book.

It should be added, too, that the identified presence of such competencies as regularity, consistence, diligence and high level of aspirations related to improvement of held competencies in managers in the planned economy [Chełpa 2003, p. 100], is consistent with the model of requirements developed for managers in the market economy, and in the knowledge-based economy, too. This may show that these are permanent competencies, characteristic for all managers.

To some extent, it is difficult to refer precisely to changes in the analysed types of economy concerning the competency of intellectual capacity. A moderate level of this competency within the planned economy is shown by research by Z. Dobruszek [1976]. S. Chełpa argued [2003, p. 113] that upon

⁷³ All competencies presented in this section are defined according to terminology applied and described in previous sections.

analysis of research held at different times in the market economy it turned out that managers' results of intellectual capacity measurements ranged within the broad interpretation scope of "reduced – increased". They showed a moderate [Chełpa 2003, p. 273], and sometimes higher [Witkowski 1995; Dąbek, Jarmuż, Witkowski 1994], or then again lower level of intellectual capacity [Chełpa 1992]. Thus, the obtained results do not permit for determination of a specific rule or tendency of change concerning this competency. However, the demand for this competency has grown markedly in the knowledge-based economy [Hodgkinson, Sparrow 2002, p. 195; Listwan, Stor 2008, p. 106, 112; Rakowska 2007, p. 95; Bolesta-Kukuła 2003, p. 177].

Another analysed competency which has changed within the studied types of economy is openness to experience. In the planned economy a very low level of openness to experience was observed, including a very low level of creative thinking [Dobruszek 1976]. This situation improved somewhat in market economy, where such competencies as imagination and creativity gained importance [Chełpa 2003, p. 255]. However, many researchers believed that intolerance of change persisted, and especially lack of innovativeness [Chełpa, Listwan 1996; Rakowska, Sitko-Lutek 2000; Chełpa 2003, p. 273]. Openness to experience, which includes tolerance to change, creativity, innovativeness, ideals, orientation on learning, openness to new values, has become a crucial competency of management staff in the knowledge-based economy [Collins, Porras 2003; Walkowiak 2006, p. 123; *Podręcznik Oslo* ... 2008; Boyatzis, Ratti 2009; Cherniss, Grimm, Liautuad 2010; Sajkiewicz 2008; Jabłoński 2009, p. 213; Jabłoński 2009; Czubasiewicz, Nogalski 2010, p. 145-146; Géraudel 2011; Michalak 2012; Kupczyk 2009a; 2013a, p. 313-315].

A permanent trend in evolution of management staff's competencies from the planned economy to knowledge-based economy concerns extraversion, too. The regular growth was observed by S. Chełpa [2003, p. 256] between the planned economy and market economy. It was evidenced in his opinion by regularly decreasing level of reflective attitude (orientation on indepth analysis of one's own and other people's behaviour), as well as the increasing number of people of extravert type of personality among studied managers [Chełpa 2003, p. 256]. Considering results of empirical research described in chapters 3, 4 and 5, one may conclude that in the knowledge-

based economy these competencies have developed further, that the knowledge-based economy requires opening to the external world, activity which involves interpersonal relationship, orientation on expanding knowledge and increasing competencies [Moutafi, Furnham, Crump 2007; Bipp 2008; Siuta 2009, p. 34; Kupczyk 2009e].

Another analysed component of management staff' competencies which has changed from the planned economy through market economy through knowledge-based economy is entrepreneurship. It must be noted that this competency appeared in management staff of all analysed types of economy, but it was different in form. In planned economy it was reflected in a sort of resourcefulness: finding access to possibilities, "sorting out things", "organising issues" or "waiting for a better time" [Kurczewski 1988; Wawrzyniak 1999]. In the market economy, there was no actual increase of this competency, although it was often discussed in postulated profiles of model managers. It was reflected rather "in words" (presenting plans and repeating ideas many times without attempts to implement them), "decision-making paralysis", "entrepreneurial helplessness" which consisted in avoiding organisational change and feeling of powerlessness when faced by it [Cielemęcki 1998].

This management staff tended to be unwilling to take risks, preferring security [Chełpa, Listwan 1996; Rakowska, Sitko-Lutek 2000]. They were also characterised by moderate rate of taking decisions and undertaking tasks [Chełpa, Listwan 1996, p. 243]. This situation was confirmed by multiple studies, including those held by S. Chełpa [2003, p. 257], which revealed no marked difference in entrepreneurship between planned and market economy. In the knowledge-based economy a markedly higher level of this competency has become crucial. It was reflected in creative, innovative approach to new problems and their solutions, perception and skilful application of occurring opportunities and flexible adaptation to changing conditions in the environment, motivation to achieve, feeling of being able to cause things, developing ambitious objectives, dynamism and expansive attitude, readiness to take risks and tolerance to uncertainty and unclear situations [Walkowiak 2004; Bartlett, Ghoshal 2004, p. 758-770; Zacher 2007, p. 41-42; Jasińska 2012; Michalak 2012]. In the knowledge-based economy,

in the environment of intensive effects of complex and variable factors, rapid decision-making has become crucial [Karpowicz, Szaban, Wawrzyniak 1998; Welch 2005; Kupczyk 2009e, Wójcik 2009; Howard, Wellins 2009; *A Guide to the Project* ... 2009; Czubasiewicz, Nogalski 2010, p. 145-146]. Therefore, such competencies have become important as fast reaction (short time needed for reaction to external stimuli), activity (energy), swift decision-making, readiness to take up risks and new tasks.

Within the analysed types of economy, a gradual change was found concerning management staff's knowledge. The trend involved especially an intensive growth. The growth tendency concerned especially organisational and management knowledge, including knowledge of economics. Management staff in the planned economy missed it [Stolarska 1998]. Despite its increase in the market economy, its level was still considered too low [Chełpa 2003, p. 257-8; Rakowska, Sitko-Lutek 2000]. Its meaning has increased markedly in the knowledge-based economy in making both tactical and strategic decisions. Similar changes involved management staff's knowledge of foreign languages [Stolarska 1998; Chełpa 2003].

Attention should be paid to strong growth tendency concerning specialist knowledge, although it was present only in the planned economy [Kostecki 1979; Szaban 1979; Nawojczyk 1996; Listwan 1986; 1993; Rybicki 1990; Morawski 1994] and market economy [Kunert 1996; Chełpa, Listwan 1996; Rakowska, Sitko-Lutek 2000; Karpowicz, Szaban, Wawrzyniak 1998]. In the knowledge-based economy, the importance of this knowledge was reduced, contrary to knowledge of economics, as shown by empirical results discussed in chapters 3, 4 and 5.

It is mentioned more and more frequently that in the knowledge-based economy it is necessary to put more stress on development of management staff with respect to new knowledge of comprehensive nature, concerning preparation for work at projects, in teams and individually, protection of intellectual property and industrial rights, IT skills, mobile technologies, knowledge of ecology and lifelong learning [Matusiak, Guliński 2010, p. 146]. Knowledge of worries of the enterprise and its staff has become crucial for management staff in the knowledge-based economy, too [Kupczyk 2013a, p. 313-322], as well as knowl-

edge of forecasts and development trends which concern economy in the global aspect [Starzyk 2010; Kupczyk, Kubicka 2010b; Kupczyk 2013a, p. 313-322].

It is worth noting that a change over time has been observed in relation to skills of management considering interests of different groups. In the planned economy, management staff took into account ensuring support of communist party authorities [Polańska 1999, p. 64] and "soothing social tensions". In the market economy, management staff preferred management focused mainly on shareholders and profit [Krips 1992; Szaban 2000; Obłój 1998]. In the knowledge-based economy, the staff had to develop skills of management oriented on all stakeholders of the organisation (corporate social responsibility and sustainable development).

A longer remark should be devoted to competencies related to managing people in organisations. In the planned economy management staff had interpersonal skills (taking care of subordinates and teamwork skills) [Błaszczyk 1999; Czapiński, Wojciszke 1997]. A. Polańska [1999, p. 64] found it grounded, because "in socialism, effectiveness of action (...) relied on support of communist party authorities. This support was easier to gain, if management was supported by the staff". During the transformation process (market economy), in her opinion, conditions have changed and a new approach of management staff to employees appeared, because managers had to focus on satisfaction of consumers' needs and tax authorities' requirements. Achievement of economic results have become a priority and as a result, managers were oriented on fast financial effect, which had negative influence on employees. Similar opinions were presented by H. Krips [1992], J. Mączyński [1996], B. Wawrzyniak [1998, p. 90], J. Szaban [2000], K. Obłój [1998] and A. Rakowska [2007, p. 127]. Consequently, a reduced significance of interpersonal skills was noted [Wawrzyniak 1998, p. 90; Doktór 1998; Gładys-Jakóbik 1999; Polańska 1999]. Somewhat different conclusions arise from research by S. Chełpa and T. Listwan [1996]. In their opinion, management staff of this period was characterised by greater interest in managing people and influencing subordinates.

There is another observable trend: while importance of some competencies related to task orientation grew notably between the planned economy and market economy [Chełpa 2003, p. 257-258], this phenomenon has

been replaced in the knowledge-based economy by competencies which allow for balancing task orientation with focus on employees' interests.

There are also management skills which have developed dynamically in the knowledge-based economy, while they were virtually absent before, such as:

- knowledge management [Kisielnicki 2003; Morawski 2006b; Edersheim 2009, p. 25, 42; Kupczyk 2013a; Antczak 2013];
- personal development of managers themselves and employees (lifelong learning) [Oleksyn 2006, p. 92; Gangani, McLean, Braden 2006; Rakowska 2007; Listwan, Stor 2008, p. 106; Wasiluk 2009; Sitko-Lutek, Skrzypek 2009; Fołtyn 2009, p. 149; Jabłoński 2009; Chmielecka 2011];
- change management [Rakowska 2007, p. 127; Mikołajczyk 2010,
 p. 274-291; Cyfert 2011, p. 157];
- making innovation a competitive advantage factor [Taylor, la-Barre 2007; Gupter, Carpenter 2009; Grabowska, Drygas 2010; Gwarda-Gruszczyńska, Czapla 2011, p. 14; Michalak 2012, p. 36; Awa et al. 2012; Antczak 2013, p. 56; Penc 2013];
- application of information and communication technologies [Rost-kowski 2003; *Economist Intelligence Unit...* 2008; Penc 2011, p. 319; Wang, Haggerty 2009; 2011; Filipowicz 2011, p. 5; Michalak 2012; Kupczyk 2013a; Brown 2002; Silbergh, Lennon 2006];
- cooperation, teamwork, building networks, network partnerships and mergers [Bartlett, Ghosal 2003; Sikorski 2006, p. 98; Gupter, Carpenter 2009; *A Guide to the Project...* 2009; Czubasiewicz, Nogalski 2010, p. 145-146; Krzakiewicz 2011, p. 77; Michalak 2012, p. 36; Antczak 2013, p. 56];
- diversity management [Penc 2000, p. 349; Kubicka 2009a, p. 59-82];
- management of sustainable development and corporate social responsibility [Kubicka 2010b; Krzakiewicz 2011, p. 77; Kupczyk, Kubicka 2013b];
- predicting future [Cyfert 2011, p. 157; Krzakiewicz 2011, p. 77].

Variability of management staff's competencies from the planned economy through market economy to the knowledge-based economy is shown in Table 6.1.

Table 6.1. Key competencies of management staff changing from planned economy to market economy to knowledge-based economy

Changes of management staff's competencies				
planned economy	market economy	knowledge-based economy		
Key psychological traits				
emotional stability	emotional stability	emotional stability		
very low level of open-	low level of openness to	openness to experience, includ-		
ness to experience, including low level of	experience, including no spirit of innovativeness,	ing large imagination, searching for new experiences, tolerance		
innovative thinking,	reluctance to change,	of change, creativity, innova-		
intolerance to change	low flexibility	tiveness, broad-mindedness,		
intolerance to enange	low nexionity	originality, focus on learning,		
		openness to new values, diver-		
		sity, flexibility		
moderate extraversion	growing extraversion	high level of extraversion		
	8	3		
moderate intellectual	moderate intellectual	high level of intellectual skills		
skills	skills			
socialistic entrepreneur-	low entrepreneurship,	high level of entrepreneurship,		
ship, reflected in finding	rather a declared value	mainly concerning innova-		
"access" to authorities,	than acting principle,	tion, high activity, including		
"sorting out and organ- ising things", "waiting	average activity, unwill- ingness to take risks	fast decision-making and fast undertaking of responsibilities,		
for better time"	ingliess to take lisks	readiness to take risks		
low social skills	average level of social	high social skills		
low social skills	skills	mgn social skins		
low moral attitude	low moral attitude, ten-	ethical and moral attitude, hon-		
	dency to underestimate	esty and reliability		
	honesty			
Key knowledge				
specialist knowledge	broad specialist knowl-	lesser specialist knowledge, broad		
	edge	range of knowledge of different		
		domains, e.g. knowledge of psy-		
		chology, knowledge about trends and forecasts which affect econo-		
		my, knowledge of ICT, of ecology,		
		culture etc.		
narrow organisa-	medium level	broad knowledge of manage-		
tional and management	of knowledge of	ment		
knowledge	management			
lacking knowledge of	average knowledge of	broad knowledge of economics		
economics	economics			

vory wook knowledge	avaraga knowladga of	very good knowledge of foreign		
very weak knowledge of foreign languages	average knowledge of foreign languages	languages		
knowledge of state	very weak knowledge of	broad knowledge of issues		
of the general opinion	issues concerning the en-	concerning the enterprise and its		
of the general opinion	terprise and its staff	staff		
Key skills				
average skills to lead	low skills to manage	high skills to manage human		
people and care taken	people	capital, including knowledge		
about their opinions/				
moods				
medium level of	low interpersonal skills,	high interpersonal skills (sub-		
interpersonal skills,	object-like treatment of	ject-like treatment of employees,		
teamwork	employees, marginalisa-	ability to translate corporate		
	tion of their needs, low	objectives to individual employ-		
	teamwork skills	ees' goals), focus on teamwork and project work		
no focus on customer	focus on customer up to	ability to maintain long-lasting		
no locus on customer	the moment of purchase	relations with customers and in-		
	the moment of purchase	clusion of customer in product		
		creation processes		
no skills of personal	perception of neces-	broad skills of personal devel-		
development of oneself	sity of learning, but	opment of oneself and staff		
and staff	with low willingness to	(lifelong learning)		
	participate in organised			
-1.1144	education	1-11		
ability to ensure support of commu-	skills of manage- ment focused on profit	skills of management focused on all stakeholders of the organisa-		
nist party authorities	and shareholders only	tion (corporate social responsi-		
and soothing social	and shareholders only	bility and sustainable develop-		
tensions		ment)		
limited relations	skills to compete, inde-	cooperation skills, ability to		
with the environment	pendent actions	build networks and network		
		partnerships		
skills of management	ability to manage ef-	management based on knowl-		
based on repeated ac-	ficiency, application	edge application and innova-		
tions and procedures	of knowledge only of	tions, using knowledge of all		
	a small group of employees	employees in the organisation		
ability to achieve	ability to achieve com-	ability to achieve competitive ad-		
competitive advantage	petitive advantage based	vantage based on intensive applica-		
based on political rela-	on efficiency	tion of knowledge, innovation, ICT,		
tions		human capital with its development		

orientation on imple- mentation of plans, focus on tangible assets of the organisation and political guidelines, autocratic management style, low skills of del- egating responsibilities	using of "power over people", ability to commend and control of their implementation, focus on tasks	skills to manage with people (participative style, ability to replace power with coordination, training and counselling), balancing focus on people and tasks, delegating responsibilities
ability to select orienta- tion into the organisa- tion to ensure internal stability	skills of local orien- tation i.e. focus on national and regional markets	skills of global orientation, operating at international markets

Source: originally developed by Teresa Kupczyk.

Concluding this part of the chapter which concerns changes of competencies of management staff in the period from the planned economy to market economy to knowledge-based economy, it seems justified to state that some competencies are constant and subject to virtually no change, while others evolve with variable dynamism. Therefore, some competencies are independent from specific conditions, while other ones are determined by the type of economy in which managers operate.

It should be stressed that some authors argue that the model of a "socialist manager" postulated by W. Raczyński i Z. Tyrka (quoted from [Kwejt 1968]) could be applied even now [Chełpa 2003, p. 107-108]. This is confirmed by research by O. Kunert [1996] and E. Karpowicz, J. Szaban i B. Wawrzyniak [1998]. B. Wawrzyniak [1999] claims that the only exclusions concern two competencies: entrepreneurship and interpersonal skills. This remark seems justified only in the case of a comparison between the planned economy and market economy, because the range and intensity of changes in the knowledge-based economy are much larger.

However, it seems grounded to conclude that the crucial competencies of management staff in the knowledge-based economy as described here are similar to features attributed to entrepreneurs for a long time (e.g. flexibility, openness to change, taking risks, coping with stress, emotional stability, correct self-assessment, self-confidence, moral/ethical behaviour).

This may prove that all representatives of (employed) management staff should become entrepreneurs.

The analysis in this chapter permits yet another conclusion, that concerning qualitative changes of competencies one may observe from the planned economy to the market economy and knowledge-based economy a growing professionalism of management staff and its increasing reorientation to social and environmental values.

The final conclusion may be drawn that changes which are actually implemented and result from transformation to the knowledge-based economy will force modification of competencies held now by management staff.

6.3. Final conclusions, postulates and recommendations

Comprehensive analysis of the research, both empirical and literature studies along with the author's original reflections lead to final conclusions, opinions and postulates concerning the problems of key competencies of management staff in the knowledge-based economy. These final reflections are as follows:

- 1. Competencies of management staff are a determining factor of development of the knowledge-based economy and corporate results within this type of economy.
- 2. The nature of the research held, both in description and diagnosis, should inspire and simplify setting a direction of changes in modern selection and education of management staff. It is necessary to revise previous models of competencies of management staff and shaping them considering their usefulness for achieving good corporate results in the knowledge-based economy.
- 3. Lately, an increasing intensity of crisis phenomena has been observed at enterprises. Management staff can't cope with this situation on one hand, but on the other hand: the impressive results of knowledge-based enterprises lead to a reflection that knowledge application stimulates development of an organisation.

- 4. Women's competencies to manage in the knowledge-based economy are a great potential which should not be wasted. As shown by the research, their strengths included competencies which were crucial in the knowledge-based economy. Societies and economies which understand and use this fact, will achieve great profits, especially in future. Thence, a postulate to recruit more women to top management of enterprises. Successful management in the knowledge-based economy requires cooperation between women and men, considering their variable strengths. Therefore, it is necessary for management bodies to include a relevant number of both men and women.
- 5. As shown by the research, there are not enough grounds at the moment to develop a model of correlations between competencies of management staff and corporate results in the knowledge-based economy considering the criterion of sex. Further research is necessary, covering a markedly larger research sample of women at management positions at the best knowledge-based enterprises listed in rankings.
- 6. The theoretical research held permits a conclusion that key competencies of management staff which correlate with corporate results in the knowledge-based economy are not only in Poland still insufficiently analysed, especially considering gender. It should be noted that this is a very difficult phenomenon and its analysis requires setting some complex methodology issues in order.

Therefore, the presented research results should be analysed carefully. It is necessary to continue theoretical and empirical exploration of this area, which would allow for rationalising research methodology and setting terminology and opinions in order. It would be especially interesting to organise international research of these issues. It would allow for identification which competencies are crucial in entirely knowledge-based economies and capture the specific features of the Polish management staff and Polish economy.

Conclusion

The main objective of the research was achieved, as key competencies of management staff in the knowledge-based economy have been identified. The research described in the book allowed for positive verification of the predefined hypotheses, confirming that:

Hypothesis no. 1 (H1): In the knowledge-based economy some competencies of management staff have become crucial.

Hypothesis no. 2 (H2): There are correlations between competencies of management staff and corporate results in the knowledge-based economy.

Hypothesis no. 3 (H3): There is a competencies gap of management staff concerning competencies which are crucial in the knowledge-based economy.

It seems that the added value of this work is manifested in several achievements which are original in cognitive aspect (in the theoretical and empirical fields) and in practice. These are:

- presentation of variable approaches and interpretations in defining competencies and knowledge-based economy;
- initiating empirical research of the virtually never studied area, i.e. competencies of management staff which are crucial in the knowledge-based economy, considering sex of managers and correlations with corporate results;
- an in-depth identification of competencies held by management staff, which are significant in the context of the knowledge-based economy, as well as the competency gap in this area;
- development of a model of crucial competencies of management staff in the knowledge-based economy and their correlations with corporate results of enterprises listed in rankings;
- development of a set of rules for planning and organising research (including preparation of a research tool) concerning identification of key competencies of management staff in the knowledgebased economy and their correlations with corporate results.

The issues explored in this book need further research. The presented pioneer study needs to be continued, considering specific features of dif-

ferent industries, context of managers' work, sex and age of management staff, internationalisation of operations. It would be valuable to hold studies with larger samples, especially in the case of knowledge-based enterprises listed in rankings and even more: of those of them which employ women as top managers. Their role in management of enterprises seems difficult to overestimate, considering demographic issues and competing for talents. It would be very important to verify the applied methodology of research and the developed model, too. Also, changes in the mode of defining management competencies should be considered and evolution of the role of key competencies in the knowledge-based economy and corporate results should be followed-up. It is necessary to monitor constantly the competencies gap revealed among management staff concerning management in the knowledge-based economy. Finally, it would be valuable to conduct research at universities which educate management staff concerning the offered curricula and their adaptation to the needs of the knowledge-based economy. It would be intellectually attractive and very useful for practical application at the same time. Such research should be comprehensive, and therefore it more be difficult – in methodology and otherwise. The meaning of management staff for the modern developing knowledge-based economy, however, is so big that it is worth the effort. Certainly, an international cooperation of researchers of different geographical regions would be valuable, too, to include current economic powers, as well as those countries which aspire to the positions in rankings. It would be also interesting to initiate a campaign, especially in Poland, to promote advantages of research concerning management competencies held by universities and to diffuse their results at enterprises. This could bring measurable profit to enterprises and managers themselves and make them more willing to participate in research.

One important remark may be mentioned at the end. The presented confrontation of empirical data with theoretical research results and the resulting development of fundamental conclusions, postulates and model of correlations between competencies of management staff and corporate results in the knowledge-based economy should be treated as a starting point to further analysis of this difficult and multi-disciplinary problem. The author believes and hopes that these issues will be interesting for many re-

searchers and that the effects of their work will contribute to improvement of systems of selection, recruitment and training of management staff, and also to dynamic development of the knowledge-based economy in Poland and to successes of enterprises.

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Appendix 1. Questionnaire "Key competencies of management staff in the knowledge-based economy" – research tool

Dear Sir / Dear Madam,

The University of Business in Wrocław and the Lower Silesian Chamber of Commerce are implementing the research project entitled "Support for Development and Adaptation in Lower Silesia", co-funded by the European Union. The first area of research is focused on key competencies of management staff in the knowledge-based economy. You are kindly asked to share your opinions on this issue with us by filling in the present questionnaire. We thank you warmly in advance for your time and assistance.

Wishing you all success, not only in management, Teresa Kupczyk, Ph.D., M. Eng. –Research Content Manager

Questionnaire "Key competencies of management staff in the knowledge-based economy"

The knowledge-based economy is defined in this study as an economy where knowledge is created, learned, diffused and used more effectively by enterprises which rely on it in their competitive advantage. Similarly, a knowledge-based organisation is an organisation which creates, learns, diffuses and uses knowledge more effectively and relies on knowledge in its competitive advantage.

1. Is the enterprise you manage a knowledge-based organisation (operating within the knowledge-based economy?

\square yes \square not entirely, but the transformation process is quite advanced
$\ \square$ only partially $\ \square$ not yet, but we have initiated the process and the work
proceeds intensively \square we have initiated the transformation process, but it
is slow \square no

2. Which competencies do you find crucial in the knowledge-based economy (significance of the competency in question – please mark on the left from 1 – irrelevant, 2 – small, 3–4 – medium-big to 5 – very big). Which of these competencies are you strong at (please mark strength on the right from 1 – very weak, 2 – weak, 3 – medium, 4 – strong to 5 – very strong). 2.1. Psychological traits: 2.1.1. □ openness to experience (high level of imagination, searching for new experience and things, tolerance of change, creativity, innovativeness, broad-mindedness and broad interests, phantasy, originality, culture, aesthetics, emotionality, having ideals, focus on learning, openness to new values) 2.1.2. □ **emotional stability** (control of emotions, composition, confidence, stress-resistance and realism in thinking) 2.1.3. □ extraversion (openness to others and tendency to optimism and positive emotional approach to the world, activity, willingness to talk, sociability, cordiality, searching for new experience, interest in the world, leadership attitude) □ 2.1.4. □ amicability (helpfulness, willingness to forgive, good predisposition, frankness, trust, altruism, compliance, modesty, delicacy, manifested willingness to cooperate and generosity) \square 2.1.5. ☐ **diligence** (being organised, tendency to order, precision, efficiency, responsibility, ambition, consistence, self-discipline, dutifulness, striving for achievements, autonomy in setting and achieving objectives, reason, order, conscientiousness, practical approach) □ 2.1.6. \(\subseteq \) low reactivity (low sensitivity to disturbances, large capacity, short phase of preparation for work, fast concentration on fundamental issues, ability to work intensively, at the maximal rate when facing disturbances, noise, emotional difficulties, strong stress, time pressure or fatigue) 2.1.7. \square rapid reaction (short time of reaction to stimuli) \square

26)
2.1.8. \Box activity (high level of energy, fast moves, quick undertaking of tasks and decision-making, facility in taking risks and new responsibilities, impulsiveness) \Box
$2.1.9.$ \Box focus on principles (characteristic for a person who lives by unchangeable and fundamental values, requires high responsibility and ethics from themselves and others, a person who can be trusted and who is reliable, who is hard-working if the work's objective is consistent with their values) \Box
2.1.10. ☐ intellect/intelligence (efficiency of information processing, efficiency of learning, cognitive strategies, adaptation to the changing environment, rapid recognition, association, flexibility and capacity of thinking, fast rate of intensive and flawless intellectual work, defining of terms, understanding of correlations, perception of analogies and strategic thinking) ☐
2.1.11. □ rivalry skills □
2.1.12. \Box degree of emotional intelligence (self-awareness (recognising one's emotions, correct self-assessment, self-confidence), self-control, motivation, ability to understand situations and reactions of team members, empathy, creating good relations with other people) \Box
2.1.13. □ entrepreneurship □
2.1.14. \Box analytical skills (characteristic for a logical person of disciplined mind, who is able to search for data to construct schemes and correlations between them, a person who reaches to the very point of a fact or reason) \Box
2.1.15. \Box individual approach (a person for whom uniqueness is the most intriguing; who captures intelligently all that is exceptional and outstanding in people; who knows what will satisfy another person, what are other persons' strengths and needs, what other person is best at; who can select an efficient team) \Box
2.1.16. □ striving to perfection – maximalist approach (a person who is interested in achieving perfection by applying what is already good; they are

fascinated by talents, strengths, capabilities; they are focused on strengths and not weaknesses; they choose what is exceptional and not the common) \Box
2.2. Knowledge
2.2.1. \square general knowledge (multidisciplinary knowledge) \square
2.2.2. \square knowledge of economics \square
2.2.3. \square knowledge of management \square
2.2.4. \square knowledge of psychology \square
2.2.5. \square knowledge of problems which concern the enterprise and its staff \square
$2.2.6.\ \square$ knowledge of trends and forecasts which affect the economy \square
2.2.7. \Box specialist knowledge (knowledge related to the subject of operations of the enterprise, the industry, conditions of its functioning, market of the enterprise's operations, customers' needs etc.) \Box
2.3. Skills 2.3.1. □ knowledge management skills (overall processes that enable creation, diffusion and application of knowledge to achieve objectives of the organisation, e.g. location, acquisition, development of knowledge, knowledge sharing and diffusion, knowledge application and maintenance) □
$2.3.2.\ \Box$ skills to implement organisational culture of a learning, knowledge managing organisation \Box
$2.3.3.\ \square$ skills related to achievement of a competitive advantage at international markets \square
2.3.4. \square management skills (planning, organising, managing (motivating) people, control) \square
2.3.5. \square forecasting skills \square
2.3.6. □ negotiating skills □

2.3.7. \sqcup skills to find education options for oneself and staff \sqcup
2.3.8. \Box talent management skills (selecting, attracting, involving and maintaining most talented employees) \Box
$2.3.9.$ \square ability to create a right workplace for employees (skills to allow them to do what they are best at, providing the right materials and equipment, letting them know what they are supposed to do and that the manager takes their opinions into account, appreciates them and trusts them, that the manager cares about them, talks to them regularly, enhances their loyalty and commitment) \square
$2.3.10.$ \square social skills (methods of efficient persuasion and discussion, communication, conflict soothing, leadership, initiation and control of change, shaping relationships, skills to share information and cooperation for common goals) \square
$2.3.11.$ \square ability to recognise important issues and prioritise them \square
$2.3.12.$ \square ability to communicate in a foreign language fluently \square
2.3.13. □ marketing skills □
2.3.14. \square ability to ensure high quality of work \square
2.3.15. □ customer-focus skills □
$2.3.16.$ \square ability to set objectives and methods to achieve them \square
2.3.17. \Box ability to increase productivity (ability to analyse data in order to determine significant problems related to performance, ability to set and revise priorities and ability to use working time efficiently) \Box
2.3.18. \Box ability to translate corporate objectives to individual employees' goals (higher pay, higher quality of life, implementation of individual aspirations, development, self-actualisation etc.) \Box
2.3.19. ☐ skills to apply information and communication technology

and techniques (information acquisition (internet, e-libraries, data warehouses), e-commerce, distance working, distance learning, management support (e.g. operational processes and decision-making), teamwork, communication) \Box
2.3.20. \Box ability to focus on intangible assets of the company (which make up its intellectual capital) \Box
2.3.21. □ others :□
Personal data of the respondent
Name
e-mail
I consent to processing of my personal data for purposes necessary to implement the project "Support for Development and Adaptation in Lower Silesia" (according to the Act on Protection of Personal Data of 29.08.1997, Journal of Laws no. 133, item 883) \square yes \square no
respondent's signature

Appendix 2. Detailed results of empirical research

Table z2.1. Statistically significant correlations between competencies of the respondent management staff which are their strengths and corporate results of knowledge-based enterprises listed in rankings – tetrachoric correlations (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Key competencies of manage- ment staff in the knowledge- based economy – strength	Cor- rela- tions	Er- ror	Left end of the con- fidence interval	Rights end of the con- fidence interval	Signif- icant?
Knowledge of economics	0.48	0.10	0.32	0.65	yes
General knowledge	0.44	0.11	0.26	0.63	yes
Knowledge and understanding of problems concerning the enterprise and its staff	0.42	0.10	0.25	0.59	yes
Management skills	0.38	0.11	0.19	0.56	yes
Ability to focus on intangible assets of the company	0.37	0.11	0.19	0.54	yes
Knowledge of management	0.36	0.11	0.18	0.53	yes
Ability to communicate in the mother tongue and in a foreign language fluently	0.35	0.11	0.17	0.53	yes
Analytical skills	0.35	0.11	0.17	0.53	yes
Skills to manage knowledge and knowledge staff	0.33	0.11	0.16	0.51	yes
Customer-focus skills	0.32	0.11	0.13	0.52	yes
Degree of emotional intelligence	0.32	0.11	0.13	0.50	yes
Low reactivity	0.31	0.11	0.13	0.50	yes
Diligence	0.30	0.12	0.11	0.50	yes
Focus on principles	0.30	0.11	0.12	0.48	yes
Ability to set objectives and methods to achieve them	0.30	0.11	0.11	0.48	yes
Knowledge of trends and forecasts	0.29	0.11	0.11	0.47	yes
Economic and marketing skills	0.29	0.11	0.11	0.47	yes
Rapid reaction	0.29	0.11	0.10	0.47	yes
Ability to improve productivity	0.29	0.11	0.10	0.47	yes
Technical, specialist knowledge	0.28	0.12	0.08	0.47	yes
Intellect/intelligence	0.28	0.12	0.07	0.48	yes
Ability to translate corporate objectives to individual employees' goals	0.26	0.11	0.07	0.44	yes
Amicability	0.25	0.11	0.07	0.43	yes
Individual approach	0.25	0.11	0.07	0.43	yes
Entrepreneurship	0.24	0.12	0.04	0.44	yes

Striving to perfection – maximalist attitude	0.23	0.11	0.04	0.41	yes
Extraversion	0.21	0.11	0.03	0.40	yes
Activity	0.21	0.12	0.02	0.40	yes
Ability to recognise important issues and prioritise them	0.21	0.12	0.02	0.40	yes
Ability to create a right work- place for employees	0.20	0.11	0.01	0.38	yes
Social skills	0.20	0.12	0.01	0.38	yes
Skills to implement organi- sational culture of a learning, knowledge managing organisa- tion	0.19	0.11	0.01	0.38	yes

Source: original analysis of empirical results.

Table z2.2. Correlations between significance assigned to particular psychological competencies by the respondent management staff in the knowledge-based economy and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Psychological competencies of management staff – significance	Chi-square statistics	p- valu	Fisher test p-value	Chance quotient
Intellect/intelligence	3.15	0.08	0.05	4.09
Diligence	2.5	0.11	0.1	2.41
Rapid reaction	3.4	0.07	0.05	2.21
Activity	3.72	0.05	0.04	2.16
Low reactivity	2.98	0.08	0.06	2.06
Extraversion	2.95	0.09	0.07	1.97
Striving to perfection – maximalist attitude	2.8	0.09	0.08	1.86

Table z2.3. Correlations between significance assigned to particular psychological competencies by the respondent management staff in the knowledge-based economy and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Psychological competencies of management staff – significance assigned	Cochran-Armitage test statistics	p- value	Signifi- cant?
Analytical skills	2.51	0.01	yes
Diligence	2.29	0.02	yes
Emotional stability	2.27	0.02	yes

Low reactivity	2.04	0.04	yes
Activity	1.92	0.06	yes
Openness to experience	1,76	0.08	yes
Extraversion	1,73	0.08	yes
Rapid reaction	1.72	0.08	yes

Source: original analysis of empirical results.

Table z2.4. Correlations between significance assigned to particular areas of knowledge by the respondent management staff in the knowledge-based economy and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Key knowledge – significance assigned	Cochran-Armitage test statistics	p- value	Signif- icant?
Knowledge of economics	3.87	0.00	yes
Knowledge of management	3.19	0.00	yes
Knowledge and understanding of problems concerning the enterprise and its staff	2.08	0.04	yes
Technical, specialist knowledge	1.77	0.08	yes
Knowledge of trends and forecasts	1.72	0.08	yes

Source: original analysis of empirical results.

Table z2.5. Correlations between significance in the knowledge-based economy assigned to particular areas of knowledge by the respondent management staff and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Key knowledge of management staff in the knowledge-based economy – sig- nificance assigned	Chi- square statistics	p- valu	Fisher test p-value	Chance quo- tient	
Knowledge of economics	9.69	0.00	0.00	6.19	
Knowledge of management	9.28	0.00	0.00	5.04	
Knowledge and understanding of problems concerning the enterprise and its staff	6.19	0.01	0.01	2.91	
Knowledge of sociology	3.66	0.06	0.05	2.01	

Table z2.6. Correlations between significance in the knowledge-based economy assigned to particular skills by the respondent management staff and corporate results of knowledge-based enterprises listed in rankings – results of Cochran-Armitage test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Key skills of management staff in the knowledge- based economy – significance assigned	Cochran- Armitage test statistics	p- value	Sig- nifi- cant?
Ability to recognise important issues and prioritise them	2.88	0.00	yes
Ability to set objectives and methods to achieve them	2.76	0.01	yes
Ability to ensure high quality of work	2.54	0.01	yes
Management skills	2.49	0.01	yes
Skills to manage knowledge staff	2.41	0.02	yes
Social skills	2.23	0.03	yes
Ability to communicate in a foreign language fluently	2.21	0.03	yes
Skills to implement organisational culture	2.06	0.04	yes
Forecasting skills	1.88	0.06	yes
Ability to improve productivity	1.85	0.06	yes
Ability to focus on intangible assets of the company	1.77	0.08	yes
Economic skills	1.73	0.08	yes

Table z2.7. Correlations between significance in the knowledge-based economy assigned to particular skills by the respondent management staff and corporate results of knowledge-based enterprises listed in rankings – results of chi-square test of independence and Fisher test (positive statistics in favour of knowledge based & rankings vs. non-knowledge-based & outside rankings)

Key skills of management staff in the knowledge-based economy – signifi- cance assigned	Chi- square statistics	p- valu	Fisher test p-value	Chance quotient
Ability to set objectives and methods to achieve them	5.73	0.02	0.01	3.81
Ability to recognise important issues and prioritise them	5.52	0.02	0.01	3.10
Social skills	5.22	0.02	0.01	2.70
Ability to improve productivity	5.08	0.02	0.01	3.22
Management skills	4.76	0.03	0.02	3.47
Economic skills	3.59	0.06	0.04	2.44
Forecasting skills	3.22	0.07	0.05	2.17
Skills to manage knowledge staff	3.18	0.07	0.05	2.45
Ability to create a right workplace for employees	3.06	0.08	0.06	2.30

Ability to ensure high quality of work	2.63	0.11	0.09	2.18
Ability to communicate in a foreign language fluently	2.49	0.11	0.10	2.07

Source: original analysis of empirical results.

Table z2.8. Statistically significant differences concerning key psychological competencies of management staff in the knowledge-based economy which are a strength of a particular sex (F - female, M - male)

Key psychological competencies of man- agement staff in the knowledge-based economy (differences of strengths between	ment – en	age- staff itire lation	man	level lage- staff	Manage- ment staff in the knowledge- based economy		Management staff in the knowledge- based econo- my & rank- ings	
women and men)	F	M	F	M	F M		F	M
Extraversion								
Diligence	X		X		X			
Individual approach								
Focus on principles								
Emotional intelligence			X					
Intellect / intelligence								X
Low reactivity								
Rivalry skills		X		X		X		
Amicability	X				X			

Table z2.9. Statistically significant differences concerning key knowledge of management staff in the knowledge-based economy which are a strength of a particular sex (F-female, M-male)

Key knowledge of manage- ment staff in the knowledge- based economy (differences of strengths between women and men)	mo sta ent pop	age- ent ff – tire ula- on	man mo	level age- ent aff	men in kn edge	nage- t staff the owl- -based nomy	Manage- ment staff in the knowl- edge-based economy & rank- ings	
	F	M	F	M	F	M	F	M
Knowledge and understanding of problems concerning the enterprise and its staff	X							

Knowledge of trends and fore-					
casts					
Technical, specialist knowledge		X	X	X	
Knowledge of psychology	X				

Source: original analysis of empirical results.

Table z2.10. Statistically significant differences concerning skills of management staff in the knowledge-based economy which are a strength of a particular sex (F - female, M - male)

Key skills of management staff in the knowledge- based economy (differ- ences of strengths between women and men)	Manage- ment staff – entire popula- tion		Top level manage- ment staff		Manage- ment staff in the knowl- edge- based economy		Manage- ment staff in the knowledge- based economy & rankings	
	F	M	F	M	F	M	F	M
Ability to focus on intangible assets of the company	X					X		
Ability to set objectives and methods to achieve them	X							
Skills to implement organi- sational culture of a learn- ing, knowledge managing organisation	X							
Customer-focus skills	X							
Talent management skills				X				
Ability to ensure high quality of work	X							
Ability to improve productivity	X							