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Who is a "knowledge worker" – clarifying the meaning of the term through comparison with synonymous and associated terms

1. Introduction

The term "knowledge workers" has entered the language of management for good and has become popular, fashionable, even colloquial. Consequently, the term is fuzzy, variously interpreted, and used with vague definitions or without defining.

Knowledge workers are the subject of research in a wide range of industries, starting with these readily associated with high-tech – like ICT (Zelles 2015; Kanellos-Panagiotis, Leo-Paul 2017; Kmiotek, Kopertyńska 2018), high-tech manufacturing (Kach et al. 2015; Drewniak, Karaszewski 2016), pharmacy and biotechnology (Salem, Yusof 2013) – through FMCG (Wroblowská 2016), through traditional professions such as lawyers (Borowska-Pietrzak 2016), to winemaking (Hojman 2015). In addition to the mainstream research topics such as work efficiency, motivation, innovativeness or ICT support, knowledge work is associated with research topics as differing as the design of ecological and sustainable office space (Krozer 2017) and literary studies (Schoneboom 2015). Sub-groups of knowledge workers are identified

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and studied, such as traditionally defined professionals (Butler 2016; Olsen et al. 2016), high- and low-level knowledge workers in manufacturing (Kach et al. 2015), older knowledge workers (aged 55-64) (Zupancic 2016), future knowledge workers (students of leading economics and business schools) (LEON 2015). Presently used alternative terms include knowledge age workers (Zelles 2015), professionals (Butler 2016; Olsen et al. 2016), specialists, intellectual workers (Borowska-Pietrzak 2016), office workers, clerks (Schoneboom 2015),

In spite of continuing interest in the work of knowledge workers, the literature provides just a few attempts to define that group comprehensively and thus to make it easier to identify and analyse knowledge workers both *en masse*, at country level, and within individual organisations. Most authors describe only these chosen features of the studied group of employees, which directly correspond with their research topics. Some authors do not define knowledge workers at all, and it is also possible to propose and analyse sub-groups of knowledge workers without defining the root term (Kach et al. 2015), or to write about their work in detail using synonyms, without reference to the term "knowledge worker" (Olsen et al. 2016). The provisional nature of the definitions can be illustrated with several examples.

P. Drucker, who is frequently referred to by present authors, was probably the first to use the term, in an article entitled "Management and the professional employee" (Drucker 1952), and described knowledge workers further in the book "Landmarks of Tomorrow" (Drucker 1957). Drucker's knowledge workers are those, who possess, utilise and create valuable knowledge. P. Drucker did not attempt, however, to precisely define the group and, not being an economist, he did not give estimates of their numbers in the U. S. economy.

The most frequently cited definition comes from T. H. Davenport, according to whom knowledge workers possess a high level of professional knowledge, education or experience, and creation, transfer and practical use of knowledge are among the core tasks of their work (Davenport 2006, pp. 21-24).

I. Brinkley (2006) defines knowledge workers through three features: 1) working in occupation classified in ISCO groups 1–3 (managers, professionals or associate professionals), 2) having high level skills, certified by a university degree or equivalent qualifications, and 3) performing tasks, that require expert thinking and complex communication skills with use of ICT. Such definition objectivises the term by referring us to criteria already widely agreed upon (such as ISCO and ISCED classifications) or potentially easier to translate into operational parameters (complex communication skills, the use of ICT).

Another attempt to comprehensively define the term comes from a HRM perspective: M. Juchnowicz's team defined knowledge workers through a wide set of universal competences they should possess (Juchnowicz 2007, pp. 24-26). Knowledge and skills are still essential, but not all-important. Other characteristics include: teamwork ability, identifying with the company, fields of interest overlapping with the job, involvement, enthusiasm, focus on objectives, need to develop, learning abilities (notably self-learning and experiential learning), readiness to share knowledge, critical thinking, creativity, innovativeness, entrepreneurship, responsibility, not just openness to changes, but willingness to introduce them, flexibility, openness to forms of employment other than a regular contract (Juchnowicz 2007, p. 26). This definition does not use commonly accepted parameters or measures, but it could be widely applied, if the listed competences were developed into well-defined scales, together with measurement procedures.

Other authors present a radically different approach, defining knowledge workers through highly subjective features. For M. Correia de Sousa and D. van Dierendonck (2010) the key features are: 1) treating work as a vocation, 2) sense of community with other employees in that occupation, and 3) requiring high autonomy.

Provisional definitions make it difficult to identify knowledge workers within organisations and at the economic level. Consequently, it is more difficult to research the group within management or economics, to analyse trends, compare, discuss the phenomenon and propose practical recommendations. The two root questions, therefore, are: 1) who are knowledge workers? And 2) how to identify them for purposes of research and knowledge management?

One of the ways of defining a term is to define its semantic area through borders and overlaps with synonyms and "adjoining" terms. Such comparisons can help to deepen the understanding of the central term and reveal its defining features. Thus, two leading questions of this study are:

1. How synonymous and associated terms can help to define the group of knowledge workers"?
2. Which of many synonymous and associated terms are closest to knowledge workers and may serve as useful proxies for research purposes?

Consequently, the study attempts to achieve two objectives:

- compare "knowledge workers" and synonymous and associated terms specifying similarities, differences and areas of overlap, to find defining features of "knowledge workers",
- specify the synonymous and associated terms closest to knowledge workers and useful as proxies for research purposes.

A group of 15 synonyms was selected, including historical and presently applied terms, proposed by various researchers or used in popular language:

- „white-collar workers" (C. Mills),
- mental workers,
- intellectual workers (W. Grudzewski, I. Hejduk, D. Makowski),
- office workers,
- bureaucracy (M. Weber and others),
- knowledge producers and distributors (F. Machlup and others),
- information workers (M. Porat, W. Baumol and others),
- symbol analysts (R. Reich),
- "cognitaries" (J. Kozielecki),
- "creative class" (R. Florida),
- „gold-collar workers" (R. Kelley),
- professionals,
- specialists,
- experts,
- managers.

These terms will first be characterized, and then compared to knowledge workers in terms of similarities, differences, and areas of overlap (sub-groups belonging to one, but not to the other).

2. From white to gold collars

The term "white-collar workers" was proposed to describe the transformation, at the turn of the 19th and 20th centuries, of a traditional middle class in USA (small entrepreneurs, farmers) into a broad class consisting mainly of hired employees (managers, hired professionals, retail and office workers) (Mills 1951). Their subsistence came not from private property, but from performed profession – from selling their competences in the labour market. As distinguished from the "blue-collar workers", the main type of their activity was mental work, cleaner and less straining – hence the perceived higher social status. Higher status came also from higher income, working environment, affiliation with a recognisable firm, greater work autonomy and powers delegated by the employer. Mills attributed rapid expansion of such jobs to: 1. rising productivity of fixed assets, 2. expanding sector of distribution, and 3. growing range of coordinating tasks. As he put it, "white-collars" could handle people, documents and money. They help to turn someone's product into someone else's profit. They supervise others, man information pathways, handle the technology and teach (Mills 1951, pp. 36-76).

The gist of the distinction for Mills was to operate not on physical objects, but on symbols. Also of importance were the scope of control, the work environment, status and the right to express one's opinion (Jemielniak 2008, pp. 36-37). Some white-collar professions receeded in status and independence, beginning in principle to resemble physical work again (cashiers, postal workers, telephone operators) (Zuboff 1988, pp. 97-123).

It seems, that the features shared by both today's knowledge workers and "white-collars" include: profession and competences as foundations of economic existence, domination of mental activity, working on symbols, status and prestige higher, than with simpler jobs, good working conditions, scope of work autonomy. In the narrower sense (supervision, manning information pathways, handling technology, teaching) "white-collar workers" could closely overlap with knowledge workers. In the broader sense (of the class pitched against the "blue-collar workers" and also encompassing simple service and information work, they would have to include the majority of today's labour market and spread widely beyond knowledge workers.

The broader sense is close to the Polish term "pracownicy umysłowi, the English equivalent of which "mental workers" – is not used nearly as much. The category functioned mostly in opposition to physical workers and comprised employees, for whom mental activity was the main or only kind of effort – which closely overlapped with "white collars". Today it seems impractical, as growing complexity and informational component of work make mental effort indispensable in most jobs. In Poland the distinction between physical and mental work was formally abandoned as early as in the Labour Code passed in 1975 (Oleksyn 2006, p. 100). Today the group of "mental workers" would encompass a vast majority of knowledge workers, but it would be wider, also comprising many jobs of simple information work requiring low or medium competence. On the other hand, it could exclude undoubtedly knowledge-based jobs, in which physical tasks are essential to achieving desired outcomes, e. g. surgeons or musicians.

The next term, "pracownik intelektualny" (Eng. "Intellectual worker"(is practically a synonym of knowledge workers. It is used by some Polish authors simply as one of Polish translations of knowledge workers (Grudzewski, Hejduk 2004; Makowski in: Jemielniak, Koźmiński 2008, p. 442).

The term " office workers" identifies a group of jobs defined mainly by the type of working environment: the office, as opposed to other environments such as a factory, a personal service establishment, a store or a farm. Office work is associated with handling documents, with acquiring, transforming, storing and

passing information, with using computer tools and documents in electronic and paper form. It does not entail physical activities (eg. manufacturing with materials and devices, or services to people)) – other, than those on documents (eg. printing, carrying, destroying etc.). The term "office workers" could then be understood as the Polish equivalent of the English "white-collar workers" (which, however, would be an excessive extension) or as their sub-group. It would be a group at the same time wider than knowledge workers (including many simpler jobs), and much narrower (excluding many knowledge workers found outside the typical office setting).

Another interesting understanding of the term "office worker" comes from its adjacency to the term "bureaucrat" and the phenomenon of bureaucracy as a stage in the evolution of work systems allowing for mass mental labour (Weber 2002, Weber 2010). Main principles of bureaucracy included the following (Jemielniak 2008, p. 73):

- to manage employees, a group of managers is required,
- there is strict and clear hierarchy and division of labour,
- employees act impersonally, i. e. apply the same set of procedures regardless of whom it is applied to,
- one's position in an organisation is chiefly determined by formal qualifications,
- professional knowledge is a key factor during recruitment for jobs,
- promotion and salaries depend not just on personal efficiency/achievement, but equally on general organisational policy,
- all decisions and procedures are archived in databases,
- it is crucial to observe secrecy.

F. Emery suggested an additional principle: whole coordination is performed at the organisational level at least one higher to the one where work under coordination is performed. The foundation of bureaucratic work was the social transaction, by which employee loyalty was exchanged for security of employment, a pension and a possibility of promotion. This made it possible to recruit, train and retain high-quality professionals. A career path relied on vertical promotion, for which it was required to demonstrate measurable competence in one's specialty. Employee's personal (especially technical) knowledge was of high value, but as vertical promotion was the only path of development, majority of employees were excluded from it, which led to wide discontent (Pinchot, Pinchot 1993, in: Myers 1996, pp. 39-53).

Bureaucracy is associated with the stereotype of a bureaucrat or an „organisation man" – a man of discipline and obedience, who knew his place (Oleksyn 2003, p. 331). He always observed procedure, refused to make exceptions in exceptional

situations, played by the rules of hierarchy, relied on superior's opinion, did not analyse or question, chose conformism (Makowski, in: Jemielniak, Koźmiński 2008, p. 444).

Since 1930s, many authors have criticized bureaucracy for leading to numerous disfunctions (T. Parsons), for inefficiency and being incapable of economic rationality (L. von Mises), for wasting resources, time and motivation (M. Crozier)(Jemielniak 2008, pp. 71-76). According to D. Jemielniak, critics of bureaucracy overlook its positive aspects, such as the importance attached to professional knowledge, the weight put on maintaining databases, or the role of information and the need to protect it – which are all postulated characteristics of knowledge-based organisations. Bureaucracy is an accepted model of work organisation, eg. in Public administration, and also undergoes evolution and improvement. Professionals may function in it well, although many contest it in principle (Jemielniak 2008, pp. 71-76). Representative bureaucracy, based largely on employees' actual knowledge and on consensus, may be an environment propitious to knowledge workers. Controlling their work may include elements of normative control – substitution of rigid norms by culture sanctioning freedom, autocontrol and cult of efficiency – or even employing the rhetoric of "freedom from bureaucracy" by bureaucracy itself (Jemielniak 2008, pp. 76-81).

To conclude, characteristics of the original bureaucracy favorable to knowledge workers included: meritocracy and importance of specialist knowledge, work on information, problem-solving, non-physical work products (solutions, decisions), continuous process of knowledge codification, necessity to protect it, and also postulated culture of objectivity and professionalism.

On the other hand, due to far-reaching division of labour, work in many jobs lower in the structure was simple, repetitive and monotonous, tied down by numerous rules and procedures, with few degrees of freedom in decision-making, loyalty was valued higher, than initiative, schematic solutions employing official knowledge were more welcomed, than creativity and innovation. Nowadays, when bureaucracies try to operate in paradigms of efficiency and democratization, they give more room to knowledge-based work. In spite of that, bureaucratic public institutions and corporations certainly give employment neither exclusively to knowledge workers, nor to all knowledge workers in the economy.

The term „knowledge producers" was introduced by F. Machlup, who was the first to undertake detailed economic research into the role of knowledge as a factor of production in USA. He treated knowledge as a product, which was produced, distributed and consumed, and constituted its own sector

of economy – the information sector. According to F. Machlup, as early as in 1958 that sector employed 31% of working population of USA (Machlup 1962). Knowledge producers were those, whose job was to create new knowledge (eg. researchers, innovators, engineers etc.) and to distribute it (eg. Teachers, journalists, telephone operators etc.). A knowledge producer had to generate its flow to others – in that sense eg. A journalist was a knowledge producer *per se*, while a dentist was just its user. F. Machlup took four occupational groups constituting "white-collar workers": 1. Professional, technical and associated staff, 3. Managers, higher officials and entrepreneurs (excluding farmers), 4. Office and associated workers, 5. Retail workers – and he eliminated chosen jobs from groups 3 and 5. A knowledge producer could do both physical and mental tasks – for Machlup the level of complexity was the deciding factor. Machlup's research was continued, among others, by M. Rubin and M. Huber (1986, pp. 192-201). According to them, the share of knowledge producers in the working population of USA reached 41,23% in 1980.

W. Baumol, S. Blackman and E. Wolff (1989, pp. 143-159) studying the same time-period, used a new term: "information workers", similar to Machlup's knowledge producers. Information workers were composed of knowledge producers (in the narrow meaning of specialists conducting research, solving complex problems and developing innovations) and of data workers – jobs amounting to processing and applying knowledge produced by the producers, with use of systems and tools developed by the producers. Between 1960 and 1980 the knowledge producer group in USA rose from 7 to 9%, and the data workers group – from 35 to 43% of the workforce. It is interesting to note, that in all 11 economic sectors, apart from farming, the share of knowledge producers in 1980 was between 7,0 and 11,7%, which suggests similar demand for knowledge producers in all sectors. On the other hand, data workers formed just 6,4% of those employed in farming, but an impressive 83,0% in the banking, insurance and real estate sector (Baumol, Blackman, Wolff 1989, op. cit.). The "information worker" category was also used by M. Porat in his fundamental reconstruction of the employment and income statistics in USA between 1860 and 1970 (Porat, in: Cortada 1998, pp. 101-131). He split this category into knowledge producers, market distributors and information infrastructure operators.

The categories of knowledge producers and information workers seem quite close to knowledge workers. Similarly to "white collars", they seem somewhat broader, also comprising simpler information work. A question arises as to the necessity of distinguishing between knowledge workers and those performing

simpler operations on information, and of the criteria of such distinction. The narrower understanding of Machlup's knowledge producers included only those contributing to progress: researchers, innovators, designers, decision-makers. But should we exclude e. g. An expert surgeon from knowledge workers just because he/she does not develop new operating procedures? J. Seely-Brown and P. Duguid (2002) wrote, that the requirement of understanding the used information could be one of distinctions: information may be possessed and handled, while knowledge has to be understood, internalized. What counts is the complexity of problems solved and operations performed. A useful category here is perhaps the term coined by R. Reich, an American politologist and labour secretary under W. Clinton (1991): "symbol analysts – employees, who work in numbers, ideas, problems and words (Handy 1996, p. 188). Such term underlines 1. Work on symbols, but also 2. Analysis – not just simple input or readout, but the requirement to understand and mentally process information.

T. Listwan (2002, p. 26) quotes a similar Polish term: "kognitariusze" (Eng. "cognitaries"(, attributed to J. Kozielecki (1996). Such employees working in the cognitive sphere, possessing information or knowing how to find it, whose work is to seek information and knowledge, and utilise them. J. Kozielecki associated with that high work mobility, a marketing approach to job offers and low loyalty towards employers. Cognitaries could be a category similar to knowledge workers, but it is difficult to elaborate on the level of overlap.

Equally uncertain is the relationship of knowledge workers to the category of the "creative class", promoted by the sociologist R. Florida It comprises not only researchers, but also poets, writers, artists, architects, and representatives of other professions, who directly manipulate symbols, thus creating new knowledge products or at least adding obvious value to existing ones (Florida 2002). Such category could be a sub-group of knowledge workers, limited to jobs requiring creativity.

The next category – "gold-collar workers", proposed by R. Kelly – is also similar, but narrower than knowledge workers. According to Kelly, it constitutes the elite sub-group of white collars, practically free from the issue of unemployment, and working (for most gratifying pay) almost solely with brains, performing tasks requiring exceptional combination of knowledge and intelligence. In contrast to regular office workers (also counted as "white-collar workers) their attitude to the bureaucratic form of work organisation is ambiguous at best, and frequently strongly negative (Kelley 1985, in: Jemielniak 2008, p. 76).

3. Popular terms: professionals, specialists, experts, managers

3. 1. Professionals

Professionals are an occupational group often named as predecessors of knowledge workers, and constitute their essential sub-group. The original professions included priests, physicians, lawyers and teachers. Then the term has undergone expansion to other so-called "free professions" and a gradual change of meaning. More and more jobs were termed "professions" and in 20th Cent. Professionals entered the sphere of interest of management science, entering the then forming large organisations (Drucker 1952; Drucker 1965). Some became more dependent on corporations (eg. accountants, engineers), and some to a lesser extent (eg. lawyers, medical professions) (Makowski, in: Jemielniak, Koźmiński 2008, p. 446). To be termed a profession, a job needed to meet several requirements, eg. a body of science-based professional knowledge; necessary education (usually academic); customer's interest and public good as sources of motivation; profession's role in fulfilling important public interest; autonomous character of work and its appraisal by peer professionals; sense of belonging to the profession ; work ethics and a code of conduct (Jemielniak 2008, pp. 37-42). According to a less favorable view of R. Hall, a profession was defined by five traits (Jemielniak 2005, p. 17):

- a well-structured theory of how the job should be done,
- authority perceived by the customer (the customer does not have competence to appraise the output),
- formal and informal rules of conduct, and sanctions for breaking them,
- a code of ethics,
- a specific professional culture.

The less positive view of professions underlines their strife for power, prestige and autonomy. Nowadays the fundamental trait of a profession can be its ability to appropriate a body of knowledge and the right to pass judgement in it. D. Jemielniak quotes a poignant definition of professionalism by E. Freidson as such institutional conditions, in which the members of a profession – and not consumers or managers – control the process of work: the access to it, the conduct and the results (Freidson 2000, in: Jemielniak 2008, p. 37).

Members of a profession organise themselves into professional corporations both for high motives (assuring quality, exchange of knowledge) and for low ones (blocking competition, covering malpractice). (Makowski, in: Jemielniak, Koźmiński 2008, pp. 452-453). Professionals are often in conflict with managers,

whom they perceive as incompetent (professional vs. corporate culture) (Jemielniak 2007) – although managers are also usually counted as knowledge workers. The knowledge worker category as a whole does not, however, display any group loyalty. Professionals often define their role through relationships with clients rather than employers (eg. Physicians). Today the typical model of profession is questioned by e. g. The growing group of professions related to IT, which control a new body of professional knowledge. The group is diverse: not all jobs can even be qualified as "white-collar" (eg. Hardware fitters or testers) – whereas system designers or analysts achieve much higher status. The software engineers' culture is frequently founded on contesting the organisation, its norms and managers. They do not try to limit access to their profession and prefer meritocracy (Jemielniak 2008, pp. 43-50).

To summarise, in the narrower sense English "professionals" may be identified with a group of occupations forming traditional professional corporations ("wolne zawody" in Polish). In this sense they are a sub-group of knowledge workers. In the broader sense the term also covers other occupations and is defined more by the level of knowledge and style of work, than by the type of occupation. It is in this broader sense, that the English "professional" has entered Polish as "profesjonalista". In the "level of knowledge" aspect, a professional is competent in his/her job, has deep knowledge and experience covering the whole of his/her profession. In this aspect, not everyone can be a professional simply because not in every type and level of work broad and deep knowledge is a necessity. This understanding draws professionals nearer to specialists (covered below). In the „style of work" aspect, a professional puts much effort into his/her work, is responsible, meticulous, competent, reliable, achieves set objectives with high probability and repetitiveness. In this aspect one can be a professional in any occupation (Makowski, in: Jemielniak, Koźmiński 2008, p. 456.

3. 2. Specialists

„Specialists" are the next possible synonym of knowledge workers. On one hand, this category may define the largest group of employees being undoubtedly knowledge workers, but on the other, it can be ambiguous in itself.

In the novel "His Master's Voice" Stanislav Lem gave possibly the most concise and critical definition: "a specialist is a barbarian, whose ignorance is not comprehensive" (Lem 1968). In English, a specialist is a person, who concentrates primarily on a particular subject or activity; a person highly skilled in a specific and restricted field (Oxford Dictionaries Online, 2018). In Polish, he/

she is a person possessing comprehensive knowledge of a given field (Słownik Języka Polskiego PWN, 2018). As can be seen, we colloquially associate being a specialist with possessing considerable knowledge in at least one limited area, and not – as with professionals – with reliability, solidity, conscientiousness and high quality. Specialist work is associated with mental work, although one may be a specialist in technical tasks (e. g. In underwater welding) Even then, however, wider knowledge and deeper, conscious understanding of the object of work are what singles out a specialist. They are what allows a specialist to perform a wider range of tasks, to solve problems with solutions, others are unable to come up with. The term is also closely linked to experience: one cannot be a specialist without it, just based on the knowledge of facts.

T. Oleksyn presented a coherent characteristics of a specialist as one of types of employees in an organisation. In his view, a specialist: 1) can do a job autonomously, effectively, safely and with good quality, according to already known and learnt processes and procedures, and 2) is able to follow national and global developments in a given discipline, and to initiate and introduce necessary changes in the organisation. Without condition 2) a person remains just a competent operational employee (in Polish: ""pracownik merytoryczno-wykonawczy" ("fachowiec")). A specialist should be able to judge him/herself, whether new solutions are required, acquire knowledge from outside the organisation, adjust it to specific needs and capabilities of the organisation, and even (although not necessarily) to discover new knowledge. In principle, though not necessarily, T. Oleksyn's specialists possess higher education. They principally do not (and often do not wish to) hold managerial posts, although they can have certain coordinating and leadership duties towards others, as competence coordinators. Many managers of small units are in fact specialists-coordinators. A principal specialist in an organisation is a specialist in a number of fields – an organisational expert (e. g. chief engineer or principal solicitor) (Oleksyn 2006, pp. 176-179).

R. Rutka gives a similar characteristics of specialists, in his description of organisational positions. The task range of specialists includes autonomous problem-solving in a given field, performing complex analysis and designing solutions, and in justified circumstances, proposing solutions and supervising their implementation (Rutka 2003, pp. 157-158). Because the position name "Specialist in. . . " was notoriously overused in Poland (Kreft, Zasadzka 2000, p. 29), R. Rutka proposed more discipline in naming such positions in organisational structures by limiting them to two situations: 1) when in a given area of tasks (a function) there is a position

with higher (wider) requirements than other similar positions (eg. a position of an "IT specialist in system design" alongside positions of "IT engineer), or 2) when in a given field of competence the position has narrower and deeper specialization, than others (eg. a "Specialist in ABS braking systems" among "Chassis mechanics"). In turn, the "chief specialist" is a position created in an organisation, when a given service is de-centralised – i. e. its specialists formally yield to managers of different units and levels. Then, a chief specialist assumes a role of a functional expert-superior towards other specialists of his/her service: maintains expert supervision of tasks within his/her specialization, designs necessary norms and procedures, provides advice and training etc. An example can be a "chief IT engineer" in a structure, where IT specialists are formally responsible to managers of their respective departments. (Rutka 2003, pp. 157-158).

Among his "knowledge producers" F. Machlup distinguished a group of "private producers of information services", who were very similar to the categories of specialists or professionals. Such occupations did not produce new knowledge, but applied existing one, adjusting it in different ways to the context and the customer's needs. As M. U. Porat accurately pointed out, specialists sold packets of knowledge, "re-packaging" it in new arrangements. The core of their work was precisely to assemble required bits of information in appropriate form, place and time – either for customers in the open market, or within organisations. According to M. U. Porat, "a specialist does not create new knowledge, but a layperson cannot apply publicly available knowledge without such an information intermediary" (Porat, in: Cortada 1998, pp. 104-106). Therefore, according to T. Listwan's definition, we can say that a specialist does not have to create new scientific, abstract, universal knowledge, but creates knowledge, which is concrete, contextual and local.

G. Pinchot and E. Pinchot wrote, that specialisation and division of labour allowed organisations to apply greater intellectual force to each chosen aspect of their activity, and allowed specialists to focus on narrow sections of work to achieve higher efficiency. In bureaucracy, a specialist was fully free from coordinating tasks, but today he/she should have sufficient autonomy and general knowledge to coordinate his/her efforts with other employees (Pinchot, Pinchot, in: Myers 1996, p. 43) – to be (almost an oxymoron) a specialist-generalist. Present specialists, therefore, having to rely on themselves, also have to be able to perform a range of hitherto managerial tasks such as: planning, problem-solving, managing relationships. It is also underlined, that large proportion of their work is in fact done in project

teams, within projects (Makowski, in: Jemielniak, Koźmiński 2008, p. 459; Jemielniak 2008, p. 46). But specialists are, by definition, not managers, and as such are often pitted against them. They are supposed to be naturally antagonistic towards managers (Jemielniak 2008, p. 114), as the "knowledge elite" against the "elite of power". Specialists of various professions may even harbour distrust towards managers and corporations in their professional culture – although these are usually negative stereotypes, from which their employers are exceptions. Also, in contrast to managers, they may not think in business terms (Jemielniak 2008, p. 117).

Because of their overlapping meanings, specialists are often confused with professionals. In English this seems to be mainly due to the term "professionals" extending and beginning to describe any employees commanding a large body of knowledge and working intellectually. J. B. Quinn, P. Anderson and S. Finkelstein (1996), for example, identified both terms, considering professionals to be those employees, who produce majority of value of today's companies, but are not managers. In turn, in Polish the term "specialist" may be one of legitimate translations of the English "professional".

For example, M. Morawski (2009) uses the terms "specialist", "professional" and "knowledge worker" interchangeably, without practically any delineation or definition. The International Standard Classification of Occupations (ISCO) is also an example of mixing the terms. Its Group 2 is termed "Professionals" in English and "Specjaliści" (specialists) in Polish. It is probably the best defined sub-group of knowledge workers. According to the latest ISCO classification from 2008 (International Labour Organisation 2018), "professionals increase the existing stock of knowledge, apply scientific or artistic concepts and theories, teach about the foregoing in a systematic manner, or engage in any combination of these activities. " Competent performance in most occupations in this major group requires ISCO level 4 skills (full higher education). Tasks performed by professionals usually include:

- conducting analysis and research, and developing concepts, theories and operational methods,
- preparing scientific papers and reports,
- advising on or applying existing knowledge related to physical sciences – including mathematics, engineering and technology, and to life sciences including the medical and health services, as well as to social sciences and humanities,
- teaching the theory and practice of one or more disciplines at different educational levels (including educating handicapped persons),

- providing various business, legal and social services,
- creating and performing works of art,
- providing spiritual guidance.

These tasks may include supervising other employees. Occupational groups and separate occupations in this Major Group are named and defined in detail. Precise classification allows for reliable measurement of their population. Numbers are measured in most countries, according to common methodology. Although occupations in this group are varied, performed in different conditions, types of activity and organisational environments, all of them require pools of knowledge at higher education level (although that does not always have to be scientifically grounded knowledge – as with several professions in arts and religions), and an appropriate process of acquiring it in theory and practice. Among all the occupations in this group, it would be difficult to name these based on knowledge to just an average or low degree (perhaps except for a few artistic professions in group 265). Therefore, choosing an occupation from Major Group 2, we can be practically certain to find a highly knowledge-dependent job.

3. 3. Experts

Experts are a group related to knowledge workers, but narrower than that and other aforementioned categories. We can associate the term with almost complete knowledge of a given subject, not available to almost anyone else. Experts possess large experience – they have seen or initiated many applications of their knowledge. They may assume the role of competent judges, judge appropriateness of actions and solutions, settle disputes. They are also associated with independence – they are in demand and are largely independent from organisations. They are a small group, concentrating at the top of the hierarchy in the field.

Concise and apt definition of an expert is given by E. Nęcka, J. Orzechowski and B. Szymura (2007). According to them, an expert is a person possessing voluminous knowledge limited to a given field, which is very well organised, proceduralised and ready to use owing to general schemes for taking action (Nęcka, Orzechowski, Szymura (2008, p. 137). Authors quote 7 features of experts according to Chi, Glaser and Farr (Nęcka, Orzechowski, Szymura, 2008, s. 168):

- they are the best in their field,
- they notice patterns and structures characteristic of problems specific to their domain,

- they are faster, than novices, in applying skills from their domain, they solve problems quicker, making fewer mistakes,
- the effectiveness of their short-term and long-term memory is above average,
- they perceive and represent a problem in their field at a deeper level, than novices – who do that at the level of superficial features,
- they dedicate more time, than novices, to the qualitative analysis of a problem,
- they are capable of self-monitoring and self-reflection.

Authors themselves draw attention to three features of experts:

1. Pattern of knowledge organisation. It is organised into multiple layers, from details to abstractions, and with hierarchy (which speeds up browsing). It is always a mixture of abstract and concrete knowledge. Expert's speed is increased by quickly substituting numerous details with few summarising categories, schemes and heuristics from higher levels.
2. Templates. Experts accumulate a lot of templates of possible events in their domain. They are used to properly recognise and address a situation. They are created by abstracting elements of real-life cases. Their flexibility is limited, therefore a large number of them is required. Experts are less flexible, than novices, in solving non-routine problems (templates do not fit), but more flexible in solving routine ones (templates fit very well). Experts more frequently approach problems scientifically, use falsification instead of confirmation.
3. High proceduralisation of mental and physical operations. Because much higher proportion of the expert's knowledge is proceduralised, the range of possible tasks is much wider for an expert, than for a novice.

Three phases of acquiring expert knowledge can be distinguished: external support, transition and self-regulation. Therefore we may meet experts at different stages of their development. We can say, that a specialist is an expert in the second phase of the process. Such an expert-beginner has a framework of knowledge and develops competences of self-monitoring and regulation of own operations, and identifies criteria for ever higher performance in the field (Nęcka, Orzechowski, Szymura 2008, pp. 169-171). In organisations, experts are those, who know the most, so in knowledge-based organisations their influence and authority-based power may be considerable. This may sometimes lead to abusing position (remuneration, resources, privileges, free time), when no one in the organisation can question their designs, plans, schedules or cost calculations. Experts can also cause interpersonal problems, when they show disregard towards employees with lower competences (Jemielniak, 2008, p. 114). M. Staniewski's research points

to elements of organisations' attitudes towards its experts. Companies more frequently recognise their internal experts, but it seems that they approach the issue from the direction of their own processes, because they identify most experts in supporting units (finances, marketing, human resources) – and not its main processes – as if their internal experts were in fact external (to their core process) (Staniewski 2008, pp. 122).

The last term to consider is the already mentioned group of managers. Major Group 1 described in the ISCO classification (which in the 2008 version is finally simply called "Managers") includes occupations, which are not necessarily highly knowledge-based – such as councillors in communal councils or parliamentarians. But also for the core group of managers in organisations it cannot be said that all of them perform highly knowledge-intensive work. Many of their regular tasks require wide knowledge and can be termed "knowledge work". However, tasks associated with influencing others, leadership and wielding power, are highly dependent not on knowledge, but on manager's personality. Other reservations concern entrepreneurs and managers in micro- and small businesses (eg. small retailing and services, who due to their function are counted as managers, but their work often requires little specialised knowledge and limited intellectual effort. Concluding, most managerial positions can be regarded as highly knowledge-intensive, but there is a significant minority, for which knowledge dependence is weaker and peripheral. In Knowledge Management literature attempts can be found to narrow the "knowledge worker" category to just specialists and to exclude managers, or even to contrast the two groups(Fazlagić 2001), but there generally is a consensus, that managers are in majority knowledge workers (Davenport 2006, pp. 21-24).

4. Synthetic comparison

Table 1 contains a synthetic comparison of terms characterised above. They are compared to "knowledge workers" in terms of their key similarities and differences, and in terms of the scope of overlap (groups included in one and not in the other). 11 terms were included. Office workers were separated from bureaucracy due to the latter's association with specific culture. Professionals were taken in their narrower sense (professions evolving corporations and cultures), while specialists were joined with the wider understanding of professionals (due also to language differences between English and Polish).

Table 1. Key similarities, differences and overlap of selected terms with the term "knowledge workers"

Term	Key Similarities	Key Differences	Wider By	Narrower By
„white-collar workers"	Role of Competences; Work on symbols (information); higher social status; higher income; work autonomy;	Includes simpler work; Focus on type of effort and work environment, not on complexity;	Simpler jobs (lower clerks, Telephone operators, typists)	–
office workers	work on information (symbols); use of documents; use of ICT;	focus on object and environment of work, not on complexity;	simple clerical jobs;	complex jobs outside offices
bureaucracy	value of professional knowledge (meritocracy); work on information (symbols); use of documents; protecting knowledge;	focus on observing procedures (formality); low flexibility and creativity; low autonomy	simple clerical jobs;	complex jobs outside bureaucracy
knowledge producers and distributors	complexity of work; knowledge = main source of value; creating, sharing and selling knowledge; use of ICT;	applying knowledge not sufficient; creating and sharing necessary;	simple information jobs;	professional knowledge users (eg. dentists)
information workers	knowledge = main source of value; work on information; creating, sharing and selling knowledge; use of ICT;	Understanding knowledge is optional; handling information sufficient	many simple information and service jobs;	–
„creative class"	Work on symbols; problem-solving; add value by creativity; new knowledge products;	Creativity necessary and sufficient;	–	knowledge work with little creativity (eg. pilots)

„gold-collar workers"	highly employable; high income; intellectual work; expert knowledge; high intelligence; high independence; against bureaucracy;	only business sector; only top of profession	–	knowledge workers below expert level
professionals (narrower)	deep knowledge; higher education; autonomy necessary; meritocracy; work ethics; reserve towards managers;	focus on reliability and quality; culture and code; group loyalty; corporationism; knowledge as power and control;	–	managers and occupations without corporations
specialists,/ professionals (wider)	deep knowledge; higher education; experience; problem-solving; create or apply (re-package) knowledge; constant learning; autonomy required; initiators; not attracted by power;	excludes managerial positions	–	managers
experts	very deep knowledge; long experience; independence; understanding problems; problem-solving; good memory;	top of occupation; strong position vs. management;	–	knowledge workers below expert level
managers ,	wide knowledge; mental work; problem-solving; decision-making; managing knowledge;	Tasks dependent on personality; partly insufficient knowledge base	simpler managerial jobs (e. g. shop-owner);	non-managerial knowledge work

Source: own study

Two terms seem to contain all knowledge workers: „white-collar workers" and information workers. They also encompass jobs lower down the complexity axis: simpler work on information. Five terms seem to be sub-sets of knowledge

workers: experts, „gold-collar workers", creative class, professionals (narrower), and specialists / professionals (broader). Experts and „gold-collars" are the smallest groups, while specialists seem to be the largest, leaving the smallest remainder. Other four terms have areas of overlap with knowledge work. They also include simpler work on information or simpler managerial jobs, and exclude knowledge work outside offices, by non-managers and without production or distribution of knowledge.

The second column, by revealing features shared with other terms, may reveal to us in fact key features of knowledge workers. These features include:

- main object of work is symbols (representations), not physical objects,
- cognitive processes are main type of effort and main source of value,
- large body of valuable knowledge, equivalent to higher education, and supported by work experience, is necessary to do work. Constant learning and updating are necessary,
- processed knowledge has to be understood, internalised, not just handled,
- work is highly complex,
- problem-solving as main activity,
- main activities include Creating, distributing and applying knowledge,
- work autonomy is necessary and expected,
- broad use of documents and ICT,
- knowledge workers enjoy higher than average social status and incomes,
- they may be opposed to bureaucracy, hierarchy and managers, and usually are not attracted by power.

The third column – differences – may also add to the understanding of knowledge workers. They show, for example, that certain features may be associated with knowledge work, but are not central to it, eg. creativity, type of effort, type of work environment, observing procedures (formality), specific occupational culture. Differences also confirm, that a job becomes less knowledge-based, when tasks are too simple, less dependent on cognitive abilities, require little flexibility, creativity or autonomy.

Four terms were not included in Table 1: mental workers, intellectual workers, symbol analysts and „cognitaries". The first is too vague, the second is a synonym resulting from translation, and for other two too scarce information was available. Their key similarities to knowledge work can be reduced to 1(cognitive effort as main type of effort, and 2) symbols (representations) as main object of manipulation.

An interesting and practical aspect not included in the table is identifiability. It is a pre-condition for other uses, such as measuring population, noting

changes, identifying other attributes, comparing etc. At the economic level, terms grounded in classifications of occupations are these easier to identify and research, ie. „"white-collars", knowledge producers and distributors, information workers, specialists / professionals (wider) and managers. Due to changes in classification, data on last two groups is readily available today, while prior ones are possible to re-construct. Terms distinguished based on different criteria present more difficulty for economic research. At the organisational level, where classifying employees is more subjective and dependent on criteria set by the researcher, all terms can be applied – although it seems, that these related to occupational groups are already better defined and easier to apply.

5. Summary

The term "knowledge worker" does not exist in vacuum – it is related to a group of terms in management and economics proposed to define similar groups of employees, and to popular terms describing groups with similar features. It is possible to achieve better understanding of the term "knowledge worker" by finding similarities and differences to other synonymous terms. Comparison to 15 such terms has pointed to a number of features strongly related to knowledge work. Based on them, a sketch definition of knowledge workers may be proposed.

Knowledge workers work mainly on symbols (representations), transforming them in cognitive processes, which is the main source of added value. To do that, they must command a large body of knowledge equivalent to university education, understood and internalised, grounded in experience and consequently updated. They perform complex tasks, focus on problem-solving, creating knowledge, distributing it and applying to achieve results. They broadly use documents and ICT, and require high dose of autonomy.

It must be underlined, that the above definition is based on the author's tacit and subjective understanding of the term "knowledge workers" and its relationships to other terms. The tacit understanding is externalised by comparing and becomes explicit. The same process can give different results for different persons. Also, the definition is limited to features identified in comparison to specific other terms – a different set of terms could draw attention to new features of knowledge workers. For example, numerous authors point to involvement as important feature of efficient knowledge work (Sienkiewicz, Moczulska 2015; Davenport 2006, pp. 26-31; Cohen, Prusak 2001, p. 17) – but terms used in this study did not have involvement as a key difference or similarity.

With respect to the second aim of the study, there are several terms closer in meaning to knowledge workers. Terms with most similarities and least differences include specialists and experts. Of these, specialists have most similarities, while experts are a narrower, more advanced type of specialists. In terms of overlap, categories closest to knowledge workers seem to be specialists/ professionals (wider) and professionals (narrower) – both are large sub-sets of knowledge workers, with specialists leaving fewer remainders. As far as identifiability is concerned, terms related to classifications of occupations are those better defined. Among them, "white-collars", knowledge producers and distributors, and information workers were measured in older classifications, while specialists/ professionals and managers are categories measured today. Both are defined in detail in ISCO-08, making them identifiable also at the organisational level. Statistics of specialists and managers are gathered regularly in most countries belonging to ILO and are easily accessible. Concluding, specialists/ professionals (wider) are the best proxy group for researching knowledge workers: they possess almost the same key features, overlap closely, leaving smallest remainder, and are defined in detail in an international classification used worldwide to measure their national populations. Selecting a random member of the group, one is practically certain to find a knowledge worker. Concluding, from among analysed terms, specialists (or professionals in wider meaning) are the term closest to knowledge workers and with features making it a useful proxy in research of knowledge work.

Summary

Who is a "knowledge worker" – clarifying the meaning of the term through comparison with synonymous and associated terms

The term "knowledge worker" has entered the language of management and economics, becoming popular or even fashionable. Consequently, its definitions are varied and often ambiguous or provisional – which makes it difficult to identify and research such employees. Deeper understanding of the term "knowledge workers" is required.

One of the ways of defining a term is to define its semantic area through borders and overlaps with synonyms and "adjoining" terms. Such comparisons can help to deepen understanding of the central term and reveal its defining features. Therefore, two objectives were set in this study: 1) to compare "knowledge

workers" and synonymous and associated terms specifying similarities, differences and areas of overlap, in order to find defining features of "knowledge workers"; and 2) to specify the synonymous and associated terms closest to knowledge workers and useful as proxies for research purposes.

A group of 15 synonyms was selected, including historical and presently applied terms, proposed by various researchers or used in popular language. These terms were first characterized , and then compared to knowledge workers in terms of similarities, differences and areas of overlap. Comparison pointed to a number of features strongly related to knowledge work. Based on them, a sketch definition was proposed:

Knowledge workers work mainly on symbols (representations), transforming them in cognitive processes, which is the main source of added value. To do that, they must command a large body of knowledge equivalent to university education, understood and internalised, grounded in experience and consequently updated. They perform complex tasks, focus on problem-solving, creating knowledge, distributing it and applying to achieve results. They broadly use documents and ICT, and require high level of autonomy.

With respect to the second aim of the study, there are several terms closer in meaning to knowledge workers. Terms with most similarities and least differences include specialists and experts. Of these, specialists have most similarities, while experts are a narrower, more advanced type of specialists. In terms of overlap, categories closest to knowledge workers seem to be specialists/ professionals (wider) and professionals (narrower) – both are large sub-sets of knowledge workers, with specialists leaving fewer remainders. As far as identifiability is concerned, terms related to classifications of occupations are those better defined. Among them, "white-collars", knowledge producers and distributors, and information workers were measured in older classifications, while specialists/ professionals and managers are categories measured today. Both are defined in detail in ISCO-08, making them identifiable also at the organisational level. Statistics of specialists and managers are gathered regularly in most countries belonging to ILO and are easily accessible. Concluding,

specialists/ professionals (wider) are the best proxy group for researching knowledge workers: they possess almost the same key features, overlap closely, leaving smallest remainder, and are defined in detail in an international classification used worldwide to measure their national populations. Selecting a random member of the group, one is practically certain to find a knowledge worker.

Keywords: *knowledge workers, knowledge work, specialists, professionals, ISCO*.

Streszczenie

Kim jest "pracownik wiedzy" – wyjaśnianie znaczenia pojęcia poprzez porównanie z terminami bliskoznacznymi i powiązanymi
Termin "pracownicy wiedzy" wszedł do języka zarządzania i ekonomii, stając się popularnym, a wręcz modnym. W wyniku tego jego definicje są zróżnicowane często wieloznaczne i prowizoryczne – co utrudnia identyfikację i badanie takich pracowników. Potrzebne jest pogłębienie rozumienia terminu „pracownicy wiedzy".
Jednym ze sposobów definiowania pojęcia jest określanie jego obszaru semantycznego poprzez znajdowanie granic i części wspólnych z terminami bliskoznacznymi i powiązanymi. Takie porównania pomagają pogłębić rozumienie głównego terminu i ujawnić jego definiujące cechy. W związku z tym w tym opracowaniu postawiono sobie dwa cele: 1) porównać pracowników wiedzy do pojęć bliskoznacznych i powiązanych, określając ich podobieństwa, różnice i stopień nakładania się, w celu zidentyfikowania cech definiujących pracowników wiedzy, oraz 2) określić terminy bliskoznaczne i powiązane najbliższe pracownikom wiedzy i użyteczne jako ich przybliżenie dla celów badawczych.
Wytypowano grupę 15 synonimów – w tym pojęcia używane w przeszłości i obecnie, proponowane przez różnych badaczy i pochodzące z języka potocznego. Zostały one najpierw scharakteryzowane, a potem porównane z pracownikami wiedzy pod względem podobieństw, różnic i stopnia pokrywania się. Porównanie wskazało zestaw cech silnie związanych z pracą opartą na wiedzy. Na ich podstawie można było zaproponować roboczą definicję:

Pracownicy wiedzy pracują głównie na symbolach (reprezentacjach), przekształcając je w procesach poznawczych, co jest głównym źródłem tworzonej przez nich wartości dodanej. Konieczne do tego jest posiadanie znacznego, równorzędnego wykształceniu wyższemu, zasobu wiedzy, która została zrozumiana i zinternalizowana, ma podstawę w osobistym doświadczeniu i jest konsekwentnie aktualizowana. Pracownicy wiedzy wykonują zadania złożone, skupiają się na rozwiązywaniu problemów, tworzeniu wiedzy, jej rozpowszechnianiu lub praktycznym zastosowaniu. Szeroko używają dokumentów i narzędzi ICT, oraz potrzebują szerokiego zakresu autonomii pracy.

W ramach drugiego celu opracowania wytypowano kilka pojęć bliższych znaczeniowo pracownikom wiedzy. Pojęcia posiadające najwięcej podobieństw i najmniej różnic to specjaliści i eksperci. W tej parze specjaliści mają najwięcej podobieństw, zaś eksperci to węższy, bardziej zaawansowany rodzaj specjalistów. Pod względem stopnia nakładania się kategoriami najbliższymi pracownikom wiedzy wydają się znów specjaliści (ang. „professionals" w szerokim rozumieniu) oraz profesjonaliści w rozumieniu węższym – oba terminy to duże podgrupy pracowników wiedzy, z których specjaliści to podgrupa większa. Pod względem identyfikowalności najlepiej zdefiniowane są terminy związane z klasyfikacjami zawodów. Spośród nich, „białe kołnierzyki", producenci i dystrybutorzy wiedzy oraz pracownicy informacyjni byli mierzeni w starszych klasyfikacjach, zaś kategorie mierzone obecnie to specjaliści i menedżerowie. Te dwie kategorie są szczegółowo zdefiniowane w ISCO-08 – są więc identyfikowalne także na poziomie organizacji. Statystyki liczebności specjalistów i menedżerów są prowadzone regularnie w większości krajów należących do ILO i łatwo dostępne. Podsumowując, specjaliści (ang. „professionals" w szerszym rozumieniu) to kategoria będąca najlepszym przybliżeniem pracowników wiedzy dla celów badawczych: posiadają praktycznie te same kluczowe cechy, pokrywają się w dużym stopniu pozostawiając niewielkie grupy poza częścią wspólną, oraz są szczegółowo zdefiniowani w międzynarodowej klasyfikacji stosowanej na całym świecie do pomiaru ich liczebności. Wybierając losowego członka tej grupy można być praktycznie pewnym, że znajdzie się pracownika wiedzy.

Słowa kluczowe: *pracownicy wiedzy, praca oparta na wiedzy, specjaliści, profesjonaliści, ISCO.*

JEL Classification: J. 24, J. 82, L. 12, L. 50

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