Quantifying the Knowledge Workforce

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Abstract

This paper presents some general findings from descriptive research on the characteristics of knowledge work. The references provide both numerical data and sources to read for further information.

The Size and Structure of the Knowledge Workforce

The first author’s grandfather worked in agriculture. His father worked in manufacturing. He works in professional services. That progression has been called the American Dream, and it is a dream that many people have shared. U. S. Bureau of Labor Statistics (BLS) data [6] shows that America has seen a long-term shift from manual labor to information work during this century. We have seen in particular a shift to knowledge work, in which people create or apply complex knowledge, instead of information support work, in which they deal with (relatively) simple information and (relatively) proceduralized operations.

Government statistics do not have explicit categories for information work, much less for knowledge and information support work. However, the first author previously did a category-by-category analysis of U.S. Bureau of Labor Statistics (BLS) data to estimate the size of the office workforce [6]. Applying that methodology to current (1998) BLS data and adding back non-office-based information support and knowledge work categories, it appears that 48% of U.S. workers have information occupations. Knowledge workers alone make up 36% of the U.S. workforce. Even in clerically intensive industry segments, such as finance, insurance, and real estate, information support workers make up a minority of all information workers [6].

Knowledge workers are more numerous than information support workers. About 36% of U.S. workers today are knowledge workers.

Some people are surprised that knowledge work is much larger than information support work, but this has been true since the early years of this century [6]. It is not simply a case of computers having replaced clerical workers and other information support workers. In fact, until the last few years, growth in clerical categories was quite high. Quite simply, most information work has been knowledge work throughout the lives of nearly all readers of this paper.

The knowledge workforce can be divided into line managers and professionals based on differences in time activity profiles (shown below) and on theoretical grounds. Given the organizational pyramid shown in most textbooks, one might assume that the line management category would be very large. However, line managers only account for about half of the knowledge workforce.

In other words, the traditional business school focus on line managers is rather shortsighted. This is especially true in the professional services industry, which is the largest industry segment today in terms of employment—larger even than manufacturing. Here, the operational workers at the base of the pyramid are often highly skilled knowledge workers, such as doctors and professors.

In the knowledge workforce, professionals are about as numerous as line managers. The traditional business school focus on line managers in knowledge support is shortsighted.

The Knowledge Worker’s Day

What do knowledge workers do when they work? At a low level of analysis, numerous “use of time” studies have employed observation or work diaries to examine what managers and other professionals do in their jobs.

The first author [5] examined data from over 50 use of time studies. The picture that emerged was very clear. In fact, broad time use profiles have varied little over time, although the recent impact of electronic mail has not been measured. For example, in the most recent study, [8] face-to-face communication time for line managers was 52%—the same percentage seen in all earlier studies.
As Table 1 shows, communication dominates the working days of all types of knowledge workers. Even professionals such as laboratory chemists and programmers spend more than half of their days communicating. For managers of all types, face-to-face communication time is dominant within the realm of communication. At the top of the managerial pyramid, executives do little else.

Communication dominates the working days of knowledge workers, but communication profiles vary by type of knowledge worker.

Within the large face-to-face category, we would like to have more detail. For instance, some meetings are small get-togethers of two or three people. Others are large conference room meetings. Unfortunately, early studies did not measure the amount of time spent in conference room meetings. A recent study [8] of line managers attending an MBA orientation used diaries to address this issue. These 14 line managers spent a quarter of their days in conference room meetings. These meetings were large, with a median of 7 people and a mean of 9.4. Most people in the room were "acquaintances" or "friends." In addition, most meetings were episodes in a series of meetings on the topic. This pattern calls into question the external validity of group support system experiments that use very small (3 to 5 people) one-time meetings among strangers.

Managers spend about a quarter of their days in conference room meetings. These meetings tend to be large, with a median of 7 people and a mean of 9. Most people in the room are friends or acquaintances. Most meetings are episodes in a series of meetings on a topic. This raises potential external validity questions for experiments using one-time meetings with 3 to 5 strangers as surrogates for business meetings.

Project Teams

The presence of so many meeting series suggests the existence of a considerable amount of project work. In fact, when asked to describe a recent project on which they had worked, about 80% of the respondents in one series of surveys [2] were able to do so. This is not surprising, because 38% of the conference room meetings mentioned in the last section were project meetings. These 165 respondents consisted of managers and professionals from a variety of industries. Their teams were fairly large, with a mean of 7.7 people, even when a few very large projects involving 20 or more people were removed from the study. On average, the teams met 16 times over a period of 6 months. People also communicated extensively outside of the meetings, averaging one contact with team members per day. Obviously, the team-based organization is not just something for the future. To a large extent, it is already here.

Projects are commonplace. They are large, averaging about 8 people. They last about six months on the average, with an average of 16 face-to-face team meetings and many contacts outside of meetings. Many are partially distributed.

One interesting fact that emerged from this study is that more than half of the teams had at least one member from another site. A very common pattern was the partially distributed work team, with most members in one location but a few members in other locations. Such partially distributed work teams may be more difficult to manage than fully distributed work teams because distant members may become second-class team members.

Meeting Purposes

Group support system researchers often focus on the support of group decision making. However, when people are asked to describe their meetings, they list a broad range of purposes, especially those involving general information sharing [4]. If we really wish to support meetings, we must develop a more sophisticated understanding of their diversity of purposes.
Meetings are held for many purposes, not just decision making. A myopic focus on group decision making is not justified by the data.

Satisfaction

Despite Dilbert-like images of meetings being hated by all involved, every study that has measured satisfaction directly [2,3,7,8] has found a high level of satisfaction. We must be careful in assuming that selling communication and knowledge management tools can be based on dissatisfaction with current arrangements.

Contrary to common belief, meeting satisfaction is extremely high.

Managing Knowledge Workers

Information systems began by focusing on clerical work processes such as transaction processing. Consequently, many of our systems analysis and application development processes have tended to focus on the automation of procedures. Panko and Sprague [9] argued that supporting knowledge workers will require new ways to approach systems analysis and application development.

In needs analysis, we need to realize that knowledge workers have few detailed procedures and that automating these few procedures may not have a significant impact on performance. Consequently, many classic tools of systems analysis will not be useful. Instead, knowledge workers focus on goals, strategies, roles, and other higher-level organizing concerns. To improve their performance, we need to focus on how to support these matters.

In development, in turn, classic development calls for a full understanding of the situation before development begins. However, knowledge workers, faced with open-ended problems, theoretically need to explore the problem to understand it, and development often takes place during this exploration. For instance, managers create spreadsheets not only to get numerical results but also to gradually solidify their understanding of situations. In other words, iterative development is needed for theoretical reasons in knowledge worker support.

Benveniste [1] analyzed the management of professional workers, but his comments are applicable to managers as well. He argued for “envelope supervision” in which the professional is given goals and other constraints but then is given broad discretion in meeting goals. Removing discretion, he argues, makes knowledge workers ineffective.

Knowledge worker support will require new techniques for systems analysis, development, and management.

As a final conjecture, it may be that the large amount of time that knowledge workers spend communicating is not only for overt coordination. It may also be for the unconscious harmonization of world views needed for knowledge workers with high discretion to work together effectively.

In conclusion, IS has always argued that to support something you must first understand it. Although knowledge work support is a hot topic today, the data collected to date indicates that knowledge work is different and more complex than it is often portrayed.

References