Chapter 6.8
Workflow Systems and Knowledge Management

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INTRODUCTION

The business reengineering movement has left two lasting benefits: One is the identification of an organization as a set of processes (Davenport, 1993); the other is an emphasis on knowledge management (Davenport, 1997). The process orientation finds an expression in workflow systems. Processes have to be supported by knowledge management. Our purpose here is to provide an outline of how knowledge management relates to workflow systems.

The main source of information on workflow systems is the Workflow Management Coalition (WFMC). In 1994, the coalition published a 55-page Workflow Reference Model (available from its Web site www.wfmc.org), which establishes a common vocabulary, a description of key software components of a workflow management system, and interfaces between these components. The WFMC has been publishing an annual workflow handbook, an example being Fischer (2004). This volume contains an evaluation of the Workflow Reference Model (Hollingsworth, 2004). For a textbook with exercises refer to van der Aalst and van Hee (2002). Important pioneering work in this area was done by Schael (1998). A somewhat dated bibliography has been compiled by the ISYS group of the University of Klagenfurt (ISYS, 2000).

We start with a few definitions, based in part on the 65-page WFMC Terminology and Glossary document (also available from the WFMC Web site www.wfmc.org), and on van der Aalst and van Hee (2002). A business process is a set of linked activities that collectively realize a business objective or policy goal, and workflow is the result of automation of this process, in whole or part. A workflow comprises cases and resources. Cases are instances of the business process, and
resources support the process. For example, the set 
of resources of an automated process that provides 
information about flight arrivals has to include 
a constantly updated database of flight data and 
a set of telephones. Every enquiry submitted to 
this system is a case.

A workflow system (WfS) manages the routing 
of cases through a workflow: A case “flows” from 
one station to another, and at each a task is per-
fomed on it. The task can be manual, automatic, 
or semiautomatic, but the definition of workflow 
as given suggests that the tasks of an ideal WfS 
should be automatic. It is important to realize that 
the ideal will not be achieved in the foreseeable 
future. Most WfSs of today are semiautomatic 
because they have to deal with unanticipated 
situations that only a human operator can handle. 
Moreover, software, the platforms on which it is 
implemented, and communication links can break 
down, requiring transfer of control to people. 
It is therefore important that the skills of these 
people be maintained by occasionally switching 
to a totally manual mode of operation.

The term “workflow,” which we take to be 
a way of writing “flow of work,” is appropriate 
because the cases move between workstations 
connected in a network. Indeed, implementation 
of workflows would have been difficult before 
computer networks became commonplace. A 
workflow management system (WMS) is a soft-
ware package for the implementation of a WfS; 
adaptation of the generic WMS to the needs of 
a specific application turns it into a WfS for this 
application. This means that the WfS is also a 
software package. A distinction has to be made 
between the movement of cases between sta-
tions and the tasks performed at the stations. 
The movement, which is what the WfS controls, 
is normally fully automated: After a case has 
arrived at a station, the task is started automati-
cally, or the system prompts a person to start the 
task; the task is then started at once, or after a 
delay. The delay may be due to a backup of cases 
or because the task is to be performed within a 
specified time window.

In the next section, we present a background 
survey, namely a discussion of processes that relate 
to workflows, and a discussion of information and 
knowledge. Then, we consider the management 
of knowledge in the context of workflow systems. 
We look to the future and offer a conclusion.

BACKGROUND SURVEY

Software Processes

In our view, the key concept of workflows is the 
use of software. With any software system, one 
has to consider: (a) the processes that create the 
software; (b) the software being created, which 
also defines a process; (c) the capabilities needed 
to implement and manage these processes; and (d) 
the knowledge resources involved throughout. As 
regards (a), the software development process can 
be regarded as a workflow system—this follows 
from the insight that the software development 
process is itself software (Osterweil, 1987).

Having established that a WfS is essentially 
a software system, we need to take a closer look 
at software development. The software process 
is made up of people, tools, and procedures. The 
people have to possess a set of capabilities that 
are to allow them to understand and make full 
use of the tools and procedures. For software 
development, such capabilities are defined by 
the Capability Maturity Model (CMM-SW) of 
the Software Engineering Institute (1995), and 
the more recent CMMI-SW (CMMI Product 
Team, 2002).

Under CMM-SW there are three types of 
processes: (1) a generic software development 
process; (2) processes derived from the generic 
process for the development of specific applica-
tions; and (3) these application processes. In 
addition, there is a process that assists in the