

---

This item was submitted to [Loughborough's Research Repository](#) by the author.  
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

## The uptake and application of workflow management systems in the UK financial services sector

PLEASE CITE THE PUBLISHED VERSION

<http://dx.doi.org/10.1080/026839699344647>

PUBLISHER

Palgrave Macmillan (© The Association for Information Technology Trust)

VERSION

AM (Accepted Manuscript)

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Doherty, Neil, and Ivor Perry. 2019. "The Uptake and Application of Workflow Management Systems in the UK Financial Services Sector". figshare. <https://hdl.handle.net/2134/8229>.

This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.



**CC creative commons**  
COMMONS DEED

**Attribution-NonCommercial-NoDerivs 2.5**

**You are free:**

- to copy, distribute, display, and perform the work

**Under the following conditions:**

**BY:** **Attribution.** You must attribute the work in the manner specified by the author or licensor.

**Noncommercial.** You may not use this work for commercial purposes.

**No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

**Your fair use and other rights are in no way affected by the above.**

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:  
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

# THE UPTAKE AND APPLICATION OF WORKFLOW MANAGEMENT SYSTEMS IN THE UK FINANCIAL SERVICES SECTOR

**N. F. Doherty**

*(The Business School, Loughborough University; n.f.doherty@lboro.ac.uk)*

**I. Perry**

*(Department of Informatics, De Montfort University, Leicester)*

Address for correspondence:

Professor Neil F. Doherty,  
The School of Business & Economics,  
Loughborough University,  
Loughborough,  
LE11 3TU,  
United Kingdom.  
Telephone: 01509 223128  
Email: n.f.doherty@lboro.ac.uk

# THE UPTAKE AND APPLICATION OF WORKFLOW MANAGEMENT SYSTEMS IN THE UK FINANCIAL SERVICES SECTOR

## ABSTRACT

*Workflow management systems (WFMSs) are an important new technology, which are likely to have a significant impact on the way in which clerical and administrative operations are organised and executed. This paper seeks to investigate how WFMSs are being exploited and utilised commercially by UK-based organisations operating in the financial services sector. In-depth interviews were conducted with fourteen project managers to explore the development, application and commercial implications of this powerful, yet flexible, technology. The results indicate that workflow technology has the potential to facilitate significant changes to the way in which an organisation conducts its business, through the automation of a wide range of document-intensive operations. Furthermore, when applied in a well-focussed manner it has the potential to realise significant increases in an organisation's flexibility, and productivity, as well as delivering major improvements to the quality, speed and consistency of customer service.*

## INTRODUCTION

Workflow management systems (WFMS) are a new technology, in terms of their uptake and application, which seek to automate the storage, processing and distribution of documents, and in so doing radically improve the performance of clerical and administrative operations. Workflow management systems are qualitatively different from the majority of traditional information systems in that they typically focus on the process, not the data which supports the process, and consequently they have the potential to greatly change the ways in which people work and interrelate with one another. Whilst the commercial potential of WFMSs has been widely discussed in the trade and popular press, very little has, as yet, been published in the academic literature.

The primary aim, therefore, of this paper is to review the experiences of some of the United Kingdom's leading financial services organisations in developing and utilising work flow management systems (WFMS). More specifically, the next section discusses the concept of workflow management systems and presents the research objectives, before the qualitative research method is reviewed in section three. The research results are presented in a series of tables that are discussed in the fourth section, and their importance is assessed in the final section.

## CONTEXTUAL BACKGROUND & RESEARCH OBJECTIVES

Workflow management systems hold the promise of supporting, and enhancing, the day to day operations of many businesses and work environments, and as a result many organisations are now already using, or actively evaluating, the technology. The amount of space devoted to WFMSs in trade and professional publications is perhaps a good indication of the high degree of interest in this new technology (For example: Business & Technology, 1996, Computing, 1996; Conspectus, 1996; Conspectus, 1997).

Whilst the published material, cited above, indicates strongly that WFMSs are an emerging technology which is likely to play an important role in the day to day operations of the majority of large organisations in the near future, very little evaluation of their commercial potential has appeared in the academic literature. An extensive search of electronic bibliographies suggests that the limited amount of research to date had tended to focus on technical issues, rather than organisational or commercial issues (For example: Hsu, 1995; Georgakopoulos *et al*, 1995; Miller *et al*, 1996).

Despite the lack of published material in academic journals, other sources such as books and professional journals have been used to prepare the following review of the current state of knowledge with regard to the nature, uptake and application of WFMSs. In particular, the recently published '*Workflow Handbook 1997*' (Lawrence, 1997) has provided a wealth of useful information for this research project, despite being primarily aimed at a practitioner audience.

## **Workflow Management Systems: Introductory Concepts**

A workflow has been defined by the Workflow Management coalition as *'the automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another for action, according to a set of procedural rules'* (Lawrence, 1997; p 385). Furthermore, they define a workflow management systems as *'the software components used to interpret process definitions, create and manage workflow instances as they are executed, and control their interaction with workflow participants and applications'* (Lawrence, 1997; p 387). The workflow is therefore the automated process, whilst the workflow management system is the software that manages the automation of an integrated set of processes. A leading software manufacturer likens WFMS to having an *'expert assistant'* at one's shoulder, fetching work, assisting with decision-making, and then passing the work on again.

A good example of the application of WFMSs is that of the international courier DHL (Computing, 1996) who have used the technology to develop a system which allows agents to access high quality parcel location information from their key boards rather than scrabbling through masses of paper documents. Workflow management systems, such as DHL's, have the potential to deliver great productivity benefits, especially when linked to document image processing (DIP) technology, as well as significantly improving the quality of customer service. Other reported benefits of WFMS technology include: improved control, improved flexibility and reduced costs (Kingsbury, 1997).

## **Workflow Management Systems: Uptake and Application**

Although there is evidence to suggest that WFMS technology is generating much interest in both the commercial and public sectors, finding reliable figures relating to the extent of its uptake is not straightforward. The Conspectus Consulting Group has, however, conducted studies in the UK which help to provide some important insights. A 1996 Conspectus Survey (Conspectus, 1996), for example, found that only one third of the organisations it surveyed, all of which were large and sophisticated, had ever used such systems. Furthermore, only half of these organisations had been using the technology for more than a year. By the time of the following year's report (Conspectus, 1997) the picture had changed markedly, with 60% of the organisations contacted already using the technology, and most of the rest actively exploring its potential. Whilst this result must be treated with some caution, because the sample sizes are small, and the sampling framework and WFMS definitions used are not specified, it does provide significant new evidence that the uptake of WFMS is increasing rapidly.

The areas for applying WFMS technology are wide, with applications being utilised in most sectors of the economy, especially the banking/finance/insurance and the public sectors (Conspectus, 1996). When it comes to specific applications, the Workflow Handbook (Lawrence, 1997) is once more a valuable source of information. It provides insightful examples of how WFMS technology is being applied for: insurance claim processing (Kingsbury, 1997); product and customer support within a bank (Edelmann & Rochefort, 1997); customer support and service within a private healthcare organisation (Ruiz, 1997);

and document processing in a government agency (Koerber, 1997). Whilst these examples indicate a broad range of potential applications, there is also a high degree of commonality in that they all share the aim of quickly and accurately processing high volumes of paperwork, and they all have a strong customer service focus.

The literature relating to the introduction of WFMS tends to concentrate on the relationship between business process re-engineering (BPR) and WFMS (For example: Jackson & Twaddle, 1997), or the role of the various workflow modelling techniques that have emerged to help capture process specifications (Barros and ter Hofstede, 1998; Georgakopoulos et al, 1995). However, when it comes to specific methods or best practice for the development and implementation of WFMS there is little in the way of published material. Consequently, organisations are having to apply traditional methods and management approaches to facilitate the introduction of WFMS, which as Fred van Leeuwin (1997) has found, often leads to unacceptably high failure rates. He suggests that the principal reasons for these levels of failure is that organisations are not prepared for the large levels of organisational change and integration that will be needed to facilitate the introduction of WFMS technology. Similarly, a recent Conspectus report (1997) highlights '*the inability to agree new processes, resistance to change and implementation issues*', as being the three major problems with the technology. The organisationally intrusive nature of the technology is, therefore precipitating a number of problems when it comes to its implementation.

## **Summary of Literature and Research Objectives**

The literature reviewed in this section of the paper has indicated that workflow management systems have created a great deal of interest within large organisations, which is quickly being translated into rapidly increasing numbers of applications. However, the interest in WFMS technology has not, as yet, spilled over into the academic community, and there is still much research to be conducted in this highly fertile research domain, especially with regard to the organisational impact of this technology. In an effort to redress the imbalance in the current published literature, a research project was initiated that included the following objectives:

- i. To explore the unique nature of workflow management systems by identifying their defining characteristics.
- ii. 'To identify the typical applications of WFMS technology within the financial services sector, both in terms of the level and type of application.
- iii. To review the methods and approaches which are being adopted for their development and implementation.
- iv. To investigate the success of the systems, in terms of benefits realisation, and in so doing identify any common success factors for the development of WFMSs.

The remainder of this paper describes the piece of work that was conducted to explore these specific issues.

## RESEARCH METHOD

The aim of this section is to describe the method employed for exploring the four research issues highlighted at the end of the previous section. The review of the literature has indicated that the organisational impact of WFMS technology has been barely touched upon in the academic literature. Churchill (1991; p 70) advises that '*if relatively little is known about the phenomenon to be investigated, exploratory research will be warranted*'. It was, therefore decided to undertake a qualitative study, targeting project managers with responsibility for the development and implementation of workflow management systems.

### **Design and Validation of the Interviews**

Given the paucity of published academic material in this research area, the interview questions were generally shaped by books, articles in professional and practitioner publications and even the promotional literature of software manufacturers proved helpful. For example, a question concerning the defining characteristics of WFMS was formulated by referencing a combination of books (most notably: Kobeilus, 1997; Lawrence, 1997) and supplier's promotional literature. In other instances, it proved possible to utilise literature from related research areas to guide the interview design. For example, a question about the role of BPR in the introduction of workflow management systems was strongly influenced by the work of Hammer & Champney (1991) and Davenport (1993). Furthermore, the professional experiences of one of the researchers helped to ensure the structured interview guide was well focussed. Having developed a draft structured interview it was validated by testing it on three appropriate individuals, and then asking them for comments on the focus, clarity and suitability of the questions. The pre-tests resulted in a number of important enhancements being made to the interview, both in terms of wording and content, before it was utilised.

### **Targeting and Execution of the Interviews**

An initial small-scale survey was conducted which helped to identify appropriate individuals who were willing to participate in the in-depth interviews utilised in this research. This survey was targeted at members of the UserNet group; a forum for representatives of organisations who are active users of the WFMS software FileNet. From the total of 30 responses well over half came from organisations operating in the financial services sector. This result provided support for evidence from other sources (For example: Conspectus, 1996 & Lawrence, 1997) that the financial services sector is at the forefront of WFMS implementation, and consequently it was this sector that was targeted. The benefit of targeting a single brand of technology (FileNet) within a specific commercial sector is that it focuses the research effort, and makes the research findings easier to interpret.

Ultimately fourteen individuals, who had WFMS project management experience within financial services organisations, were selected to participate in the interviewees. Each of the 14 interviews lasted approximately one hour, and in many instances it was followed by a demonstration of the system, which helped the researchers fully understand its potential. In most cases the face-to-face interviews were also supported by follow up phone calls to help

clarify issues and gain further insights. It can be seen from the summary of the interviewees, as presented in table 1, that the vast majority of the interviewees were project managers, either with overall project responsibility, or with responsibility for the user or the technical aspects of the project.

***Table 1 about here***

In all cases where the interviewee had participated in more than one WFMS project, they were asked to relate their answers to one single project of their choosing.

### **Analysis Strategy**

Having conducted and recorded the interviews, using either hand-written notes or tape-recordings, the results were immediately transformed into a detailed transcript. The transcripts were then analysed using a combination of '*within-case*' and '*cross-case*' analysis, as advocated by Miles and Huberman (1994). The within-case analysis involved analysing the interview transcripts using both the '*coding*' and '*marginal remarks*' approaches (Miles & Huberman, 1994; pp 55-69) to highlight important information with regard to the research objectives. The cross-case analysis was largely based on a variable-orientated approach (Ragin, 1987) in which the analysed and annotated transcripts were used to create a series of tables which clearly highlighted where there was consensus or inconsistency, with regard to interviewees perceptions of key research issues.

## **RESEARCH RESULTS**

To make the following discussion of the resultant research findings more meaningful they are related to the four specific research objectives, proposed at the end of section two of this paper.

### **The defining characteristics of workflow management systems**

Insights into the defining characteristics of WFMSs were collected using both open and closed questioning methods. Initially, each interviewee was asked to describe in their own words what they perceived to be the defining characteristics of WFMS technology. Subsequently, the interviewees were presented with a list of 12 of the most important defining characteristics of WFMS and asked to indicate the four that were of most importance in influencing their organisations to adopt the technology.

The responses to the open question got a wide range of responses, with most interviewees framing their response in terms of their own application, or the drivers that motivated its implementation. These responses included suggestions such as: quality of service; provides management information about processes; productivity tool; consistency of approach; high quality of customer service; structured control of processes; *etc.* Whilst there is obviously significance and interest in all these comments the question wasn't particularly helpful in terms of developing a consensus about the defining characteristics of WFMS.

As might be expected the responses to the more structured question elicited a higher degree of unanimity from the interviewees. The results presented in table 2 indicate that whilst there are six characteristics which were regularly nominated, the other six attracted far less support. It is interesting to note that the top six are all very much concerned with the way in which work is structured, distributed, undertaken and managed. This finding is important, as it is the ability of WFMSs to readily facilitate major changes to working practices and business processes that differentiate it from other technologies and also explain its potential to deliver significant organisational benefits.

***Table 2 about here***

In summary, the results of this analysis underline the organisationally intrusive nature of the technology, and in so doing provide an illuminating context against which to review its application, development and implications in the following sections.

### **The Typical Applications of WFMSs within the Financial Services Sector**

Each of the interviewees was asked to briefly describe the major features and functions of the WFMS that they had helped develop and implement. Whilst this question had naturally yielded a variety of different applications, it was possible to identify three distinct generic classes of WFMS being applied within the financial services sector; namely event-based systems, case-oriented systems, and distribution systems. Rather than briefly describing each individual application, it is more enlightening, therefore, to describe the features of each of these classes of system.

- **Event-based Systems:** Such systems support processes that are triggered by a specific event, such as the receipt of a mortgage application or an insurance claims form. For example, when a building society receives a mortgage application the WFMS can first check that all necessary documents, like surveyor's report and employer's certificate of earnings, have been received. It can then pass the documents, together with the mortgage application details, entered by the mortgage adviser, to an underwriter. The mortgage underwriter will then make a decision based on this information which will then be automatically despatched to the customer. Meanwhile the application is put into a suspense file pending acceptance of the offer, and the completion part of the process is similarly triggered by receipt of the signed acceptance. Event-based systems, therefore, typically manage repetitive and linear processes, and make most use of the routing and routine decision-making capabilities of the technology.
- **Case-oriented Systems:** These deal with all queries, both routine and exceptional, with regard to a specific financial product or service that has already been purchased by a customer, such as credit cards, investment accounts or mortgages. For example, WFMSs could be used in the customer service centre of a credit card provider to support customer requests for: credit limit adjustments; address changes; replacement statements; or for specific transactions to be investigated. Many enquiries will be complex, either because they ask multiple questions, or because they refer to non-

standard transactions, or perhaps to special arrangements negotiated at a local branch. Such enquiries will generate a high percentage of work that needs collation, communication outside the centre, and may take some time to handle. As a result there tends to be more use of the suspense file management, collaborative decision-making, scheduling and 'diarising' capabilities of the technology. Recent advances in case-oriented systems have seen their integration with computer telephony integration (CTI) and even interactive voice response (IVR) technologies, whereby an in-coming phone call, filtered through the IVR, will automatically trigger the retrieval of relevant customer information from the WFMS before the call has even reached an agent.

- **Distribution systems:** All financial services organisations are bombarded by huge volumes, and a wide variety, of postal communications, in the form of letters, application forms, etc. A highly effective way of processing this correspondence is through the application of WFMS technology. More specifically, it is possible to use a document image processing system to scan all incoming post and then utilise the WFMS's document routing capabilities to then swiftly distribute the correspondence to the appropriate department, where it could be processed using existing traditional technologies and procedures.

It was interesting to note that with all the specific applications reviewed there is a high degree of reliance upon, and interaction with, existing legacy systems. Indeed, one of the important advantages of WFMS technology is its ability to leverage extra benefits and working life out of existing legacy systems. This is accomplished using the process known as 'mainframe masking', which describes various techniques for bringing data transparently to WFMS users.

In addition to exploring how the technology was being applied, interviewees were also asked about the number of distinct WFMS applications that were currently operational within their organisations. In the vast majority of cases there was only a single operational application, and in the highest instance just 3 different applications. This finding supports the view that this technology, despite its huge potential, is still very much in its infancy. It is likely that as the technology becomes more widespread, the three generic categories of WFMS described above will ultimately be combined into fully-integrated systems. For example, insurance companies might link together a distribution system that handles all in-coming documents, an event-based system that manages applications for new policies and case-oriented systems that support all customer enquiries with regard to the policy over its lifetime.

## **Development Approaches adopted in WFMS projects**

When investigating the development approaches adopted within WFMS projects, the interviews focused on two different dimensions, which can perhaps best be described as the methodological approaches and the level of organisational support. Each of these two dimensions is separately reviewed below:

### Methodological Approaches

Because workflow management systems are an emerging technology, there is, as yet, no prescribed '*best practice*' with regard to their development. A series of questions was, therefore asked to gain insights into the methods, tools and techniques currently being adopted. Whilst table 3 provides a summary of the answers to these questions, a more detailed discussion of the results is also provided.

***Table 3 about here***

The results presented in table 3 indicate that the approaches taken to the development of WFMSs were generally informal. The informal and pragmatic nature of the tools and methods adopted was well summed up by one IT Project Manager (**Interview no: 3**) who stated: '*the approach was very informal, we basically used whatever worked*'. More specifically, it can be seen that the structured development approaches, such as SSADM, and the workflow-specific modelling tools were typically eschewed in favour of a less formal prototyping or RAD approach. Whilst the reluctance to use structured methods is perhaps understandable as these tend to adopt a data, rather than a process orientation, the unwillingness of organisations to adopt the process and workflow modelling tools which are specifically designed for this environment is more surprising. This result might, however, be explained by the experiences of one IT Project Manager (**Interview no: 13**) who commented that they '*had tried formal modelling techniques, but then gave up on them, as they proved inadequate as a medium for communicating process changes between designers, users and stakeholders.*'

The high number of projects in which prototyping was adopted is understandable, as it allows a high degree of experimentation and it facilitates a high degree of user input, which is critical in such an organisationally intrusive piece of technology. Furthermore, by adopting a prototyping approach project teams can deliver results in a short time-scale and increase the likelihood that support for, and attitudes towards, the technology remain positive.

Another area where there was a high degree of agreement was the need to combine the development and implementation of workflow management systems with the re-engineering of business processes. As can be seen from the findings, presented in table 3, a re-engineering element was absent from only one of the fourteen WFMS projects reviewed. The findings also indicate that there are three generic types of relationship between WFMS and BPR, each of which is briefly reviewed below:

- 1. BPR prior to the WFMS project:** Three of the participating organisations adopted a strategy of conducting a BPR exercise, and then mapping the WFMS onto the re-engineered processes. This approach is, therefore, similar to the traditional BPR strategy (Hammer & Champy, 1993) of re-engineering processes before reviewing how systems and technology can best be applied to support them.
- 2. Integrated WFMS-BPR project:** Five interviewees indicated that their organisations had executed a combined WFMS-BPR project. This approach mirrors Davenport's (1993) suggestion that it is best to consider process innovation and the application of IT in

parallel, so that the opportunities offered, and the constraints imposed, by the technology can be directly taken into account.

- 3. BPR after WFMS implemented:** Although this is not an approach advocated in the literature, four of the participating organisations acknowledged they had adopted this strategy. One Senior Analyst (9) justified it on the basis that: *'it was perceived that it would be easier to gain initial user acceptance of the technology if the existing processes were simply automated. The technology is then sufficiently flexible to allow processes to be modified once operational'*

The conventional wisdom views IT as a key enabler of process re-engineering or innovation (Davenport, 1993; Edwards & Peppard, 1994). However, this research has established that in the majority of cases the desire to implement WFMS technology was the primary driver and BPR played a supporting role. As one IT Project Manager (5) noted *'whilst we were initially attracted by the power and flexibility of workflow technology, we didn't simply want to automate existing processes. This led us to BPR'*. In the cases where BPR was the driver, WFMS technology was still perceived as playing an absolutely critical role in the enabling of the re-engineered processes. Indeed, a Project Manager (2) acknowledged that *'although BPR was the driver, until the introduction of WFMS, there wasn't much re-engineering accomplished'*.

Irrespective of the exact nature of the relationship between BPR and WFMS there was unanimous agreement that the application of the two in partnership had a synergistic effect. When asked why these approaches complemented each other so well the following quote from one Project Manager (7) perfectly summed up the prevailing view: *'WFMS provides an ideal framework for translating creative thought [the re-engineering] into practice quickly'*. The success of BPR in this context may be particularly important given the recent well publicised concerns about its impact (Davenport, 1996; Mumford, 1997).

Finally, when it comes to the implementation of WFMSs almost half the interviewees indicated that they had sufficient confidence in the resultant system, to go live with a full production version of the software, whilst the remainder opted for the more cautious pilot implementation. There was much support for the strategy of speedy implementation, so as to confirm the WFMS's potential to both users and stakeholders as quickly as possible.

### Levels of Organisational Support

Because of its potential to engender significant organisational change, it was envisaged that the successful introduction of WFMS technology would require high levels of organisational participation and support. As highlighted in table 4, the levels of senior management commitment and participation noted were generally very high. As one IT Project Manager (3) noted *'Productivity and customer service are big issues, this guaranteed senior management commitment'*. The senior management commitment was typically demonstrated through involvement in the steering committee, taking on the role of *'systems sponsor'* or *'system champion'*, and playing an active and visible role in promoting the project. When it came to

the participation, it was generally on an *'as and when required'* basis as opposed to a frequent and regular input. Furthermore, in all but one case reviewed, the WFMS project was supported and directed by a formal, multi-disciplinary steering committee that met on a regular basis. These steering committees typically had a remit for the overall direction of the project, facilitating communication, monitoring progress and resolving serious problems.

#### ***Table 4 about here***

As shown in table 4, there was also high level of agreement about the significant levels of user involvement, and its importance, in the WFMS development and implementation process. The users involved ranged from line managers with ultimate responsibility for the operation of the resultant system, through to clerical workers who would be operating the system on a daily basis. Additionally, interviewees were asked to identify the most important roles that users typically adopted. The most commonly identified roles included: preparation of the requirements specification; design of workflows; providing feedback on, and ultimately signing-off designs; and acceptance testing. It was interesting to observe that when commenting on senior management participation most interviewees simply responded in the affirmative. However, when discussing user participation responses were always immediately qualified with adjectives such as *'heavily'*, *'very actively'*, *'exceptionally'*, which indicate at least in part the very high levels of user involvement witnessed. The perceived importance of these high levels of user involvement was also strongly endorsed. It was noted that the users played a critical role in *'owning and championing the project'* (4, 5 & 8), and this has since extended into the system's operational phase where the users are now the driving force behind *'enhancements and extensions'* to the technology (3, 6, 9 & 12).

It is interesting to note that whilst there is some variability with regard to the methods, tools and techniques employed for the development and implementation of WFMSs, there is a high level of unanimity about the need for organisational support. This, therefore, provides further strong evidence that that WFMS technology cannot be developed in isolation from the organisational context in which it will ultimately be used.

### **The success of, and success factors for, WFMS projects**

The implementation of WFMSs was judged by all the project managers to have been a successful experience with the technology delivering measurable and significant commercial benefits. Whilst all of interviewees agreed that the benefits realised at least matched their original expectations, the majority noted that their original expectations had been exceeded. When asked about the nature of the benefits most were quick to highlight improvements to customer service, and significant increases in productivity and flexibility, each of which is reviewed below:

- **Productivity Increases:** The ability of workflow management systems to deliver productivity benefits was evidenced by three interviewees (3, 5 & 6) who reported productivity increases ranging from 30-60%. Many other interviewees also reported significant productivity improvements, but were not able to quantify these. It is likely that such productivity increases stem from the WFMS's potential to automate decision-making

and remove wasted time (see table 2). The increases in efficiency have been such that many of the interviewees reported the opportunity of making substantial reductions in staffing levels, for example one Project Manager (4) reported a headcount reduction in excess of 20%.

- **Improved Customer Service:** Workflow management systems also have a demonstrable and positive effect on the levels of customer service being delivered. In some instances this is due to the speed with which customer-oriented transactions are processed. For example, one Senior Analyst (9) noted: *'the turnaround time on an insurance claim has been reduced from 7 weeks to 3 days'*, whilst a Project Manager (4) commented: *'the backlog of customer correspondence has been greatly reduced as all replies are now despatched within 5 days'*, and a User Project Manager (11) described how: *'the time it took to transfer an in-coming letter from the mailroom to the customer service's in-tray had been reduced from 2-3 days to thirty minutes'*. Other areas in which improvements in customer service were noted included improvements to the accuracy and consistency of processes and the ability to track the status of work. The final major contributor to improvements in customer service is the way in which customer transactions are processed. A single *'universal agent'* can now provide a single point of response to multiple customer queries, which greatly reduces the need to pass a customer from one individual to another in order to process a single piece of work. For example, one Project manager (10) reported that: *'the number of hand-offs, whereby a customer query would need to be passed to a colleague, had been reduced by 45% through the introduction of WFMS'*.
- **Flexibility:** The concept of the *'universal agent'* also has major implications for the flexibility of employees in addition to improving the levels of customer service, as described above. The commonality of approach facilitated through the introduction of WFMS allows users to be multi-skilled. As one User Project Manager (11) noted: *'staff now work in flexible teams with any individual team-member being able to respond to any type of customer query'*. The flexibility is typically demonstrated two distinct levels, as typically individuals can readily move from team to team, as well as being able to handle all the roles within a team. It was also noted by a number of interviewees that the move towards a more flexible, multi-skilled workforce also necessitated delegating far more decision-making responsibility to individual users of the system. One Technical Project Manager (12) indicated that: *'the system was deliberately implemented as a pull technology, where users choose their work, rather than a push, where it is chosen for them'*. Consequently, workflow technologies are exhibiting a significant potential to facilitate the empowerment of the workforce.

It is interesting to note that the three primary benefits, described above, exhibit high levels of interdependence. In particular, increases in both the levels of productivity and flexibility have a direct impact on the speed and quality of customer service. Similarly, improvements in the quality and accuracy of processes improve the efficiency levels as there is less need for re-work, as well as improving the quality of customer services. Other benefits mentioned included: increased levels of integration between functional departments; improvements in employee attitudes and the provision of high quality management information. There is,

therefore, convincing evidence that the implementation of workflow technology is delivering a broad range of significant commercial benefits. Furthermore, all interviewees readily acknowledged that they would be very supportive of any moves to further extend the application of workflow technologies within their organisations. The only potential limitation or danger of WFMS technology, is that organisations can become too dependent upon it, in '*mission critical*' areas of business. It is, therefore, essential that organisations have extensive contingency plans which can be activated should the need arise.

The high levels of success derived from the application of WFMSs is perhaps surprising given the newness of the technology, its high level of organisational impact, and the absence of specialist development tools. The high degree of unanimity about the nature and significance of the reported benefits prompted the researchers to investigate the factors that contributed to successful projects. Consequently, each interviewee was asked to highlight the three most important factors from a list of eight different factors.

#### ***Table 5 about here***

The results of this exercise, presented in table 5, confirm the earlier findings that WFMS can only be successfully adopted if the development project enjoys a high level of organisational support from all the major stakeholders. A further interesting point to note is the relatively low positioning of '*the application of BPR*', which appears to conflict with the earlier finding that re-engineering has an important role to play in WFMS projects. The most likely explanation of this is that whilst BPR has an important role to play in maximising the potential of WFMS, any WFMS project which lacks organisational support may very well be stillborn. In addition to ranking the eight success factors, each interviewee was also encouraged to identify additional factors that were not on the list. The one supplementary success factor that was frequently mentioned was the need to focus the project on the delivery of '*quick wins*' and '*big hits*' (2, 5 10 & 13) to maintain organisational support. However, it was also noted that the flexibility of the technology, when coupled to a prototyping approach made this objective reasonably attainable.

## **CONCLUSIONS**

The work presented in this paper is of much interest in that it addresses an important area of research, which has not, to date, received the amount of attention it deserves. The results are of importance because they represent the views of managers who have played key roles in the development and implementation of WFMS technology in large and very sophisticated organisations. By concentrating on one specific sector (financial services) and one specific type of technology (Filenet) many confounding factors are removed and variations in the application, development and commercial implications of WFMS can be studied more precisely.

Perhaps the most significant result of this research relate to the high levels of commercial benefit attributed to the introduction of this technology. Workflow management systems have been shown to be a powerful, yet flexible, technology ideally suited to the automation of

document-intensive processes. When applied in a well-focussed manner they have the potential to realise significant increases in an organisation's flexibility, and productivity, as well as delivering major improvements to the quality, speed and consistency of customer service. In the increasingly competitive financial services sector, these are likely to be viewed as very strong arguments for major increases in their current levels of utilisation.

One of the consistent themes of this research has been to highlight the significant organisational impact of this exciting new technology. Whilst it is possible to use WFMSs to simply automate existing processes, in the majority of cases reviewed they have been used as a catalyst to fundamentally change the way in which work is conducted and managed, whilst also significantly modifying the customer-supplier relationship. Moreover, it has been shown that workflow technologies may radically modify the responsibilities of individual employees. System users become multi-skilled, '*universal agents*', who are expected to work in highly flexible teams and accept higher levels of responsibility. Consequently, the successful application of WFMS technology can only be achieved if it enjoys high levels of organisational support throughout the projects, both in terms of senior management and user, commitment and participation. Furthermore, WFMS projects will need to include wide-ranging change management programmes addressing the re-design of jobs, the re-engineering of business processes, the re-drafting of job descriptions and possibly the re-alignment of organisational culture.

Whilst this research highlights the importance of a major new technology, which has the potential to make significant contributions to organisational performance, there is still much further detailed research that needs to be undertaken. More specifically, it is important that survey-based research approaches are employed to gain broader insights into the level of penetration, areas of application and the effectiveness of WFMSs. Furthermore, the newness of the technology, suggests that a detailed comparison with more conventional technologies is warranted, both from a technical capabilities and an organisational impact angle.

### **Acknowledgements**

The authors would like to thank all those individuals who participated in this study, especially those who agreed to be interviewed, and those who helped to validate the interview schedule.

## References

- Barros, A. P. & ter Hofstede, A. H. M. (1998) Workflow-suitable conceptual modelling techniques. *Information Systems Journal*, **8** (4), pp. 313-337.
- Business & Technology (1996) The complete guide to Workflow & Workgroup Technology. *Business & Technology*, August, pp. 51-63.
- Computing (1996) Focus on Workflow Systems. *Computing*, 25/7/96, pp 21-28.
- Churchill, G. A. jr (1991) *Marketing Research Methodological Foundations (5th ed.)*, Dryden Press, Orlando, FL.
- Conspectus (1996) Workflow and Document Management Technology. *Conspectus*, September.
- Conspectus (1997) Workflow and Document Management Technology. *Conspectus*, September.
- Davenport, T. H. (1993) *Process Innovation: Re-engineering Work through Information Technology*, Harvard Business School Press, Boston, Massachusetts.
- Davenport, T. H. (1996) The fad that forgot people. *Fast Company*, January, pp 70-74.
- Edelmann, J. & Rochefort, M. (1997). Workflow Enabled Applications for Dresdner Bank. In Lawrence, P. (ed.), *The Workflow Handbook*, Wiley, Chichester, pp. 108-116.
- Edwards, C. & Peppard, J. (1994) Business process redesign: hype, hope or hypocrisy, *Journal of Information Technology*, **9**, pp. 251-266.
- Georgakopoulos, D., Hornick, M. & Sheth, A. (1995) An overview of workflow management: from process modelling to workflow automation infrastructure. *Distributed and Parallel Databases*, **3** (2), pp. 119-153.
- Hammer, M. & Champy, J. (1995) *Re-engineering the Corporation*, Harper Business, New York.
- Hsu, M. (1995) Special Issue on Workflow Systems. *Bulletin of the Technical Committee on Data Engineering*, IEEE, **18** (1).
- Jackson, M. & Twaddle, G. (1997) *Business Process Implementation*, Addison-Wesley, Reading.
- Kingsbury, N. (1997) Workflow in Insurance. In Lawrence, P. (ed.), *The Workflow Handbook*, Wiley, Chichester, pp. 91-100.
- Koerber, N. (1997) IT-supported Process Management in a Public Agency. In Lawrence, P. (ed.), *The Workflow Handbook*, Wiley, Chichester, pp. 108-116.
- Kobiellus, J. G., (1997) *Workflow Strategies*, IDG Books Worldwide Inc.
- Lawrence, P. (1997) *The Workflow Handbook*, The Workflow Management Coalition, Wiley: Chichester.
- Miles, M. B., and Huberman, A. M. (1994) *Qualitative Data Analysis*, Sage Publications: Thousand Oaks, California.
- Miller, J., Sheth, A., Kochut, K. & Wang, X. (1996) Corba-based run-time architectures for workflow management systems. *Journal of Database Management* **7**.
- Mumford, E. (1997) Risky Ideas in the Risk Society. *Journal of Information Technology*, **11** (4), pp. 321-331.
- Ragin, C. C. (1987) *The comparative method: moving beyond qualitative and quantitative strategies*, University of California Press, Berkeley.
- Ruiz, D. (1997) A workflow recipe for healthy customer service. . In Lawrence, P. (ed.), *The Workflow Handbook*, Wiley, Chichester, pp. 117-120.
- van Leeuwen, F. (1997) Learning from Experience in Workflow Projects. . In Lawrence, P. (ed.), *The Workflow Handbook*, Wiley, Chichester, pp. 186-193.

**Table 1: Interviewee Details**

<b>Interview No.</b>	<b>Organisation Type</b>	<b>Position</b>
1	Insurance	Project Manager
2	Insurance	Project Manager
3	Bank	User Project Manager
4	Building Society	Project Manager
5	Bank	User Project Manager
6	Insurance	IT Project Manager
7	Building Society	Project Manager
8	Bank	User Project Manager
9	Insurance	Senior Analyst
10	Bank	Project Manager
11	Building Society	User Project Manager
12	Insurance	Senior Analyst
13	Bank	IT Project Manager
14	Bank	IT Project Manager

**Table 2: The Defining Characteristics of WFMS**

Potential Characteristic	Score
Rules to automate decision-making (prioritising; routing; <i>etc.</i> )	13
Removes wasted time (waiting / searching for information)	10
Focuses on system outputs and customer service	10
Supports processes, not transactions	8
Delivers detailed management information about processes	8
Controls the way in which work (not data) is presented to users	7
Cuts training cycles	3
Enables priorities / thresholds to be changed immediately	2
Facilitates teamwork	1
Assists product cost analysis	1
Document scanning systems reduces the time to capture data	0
Facilitates TQM / ISO 9000 registration	0

**Table 3: Methodological approaches to WFMS projects**

Interview No.	Formal Development Methods	Specific Modelling Tools	Prototyping / RAD	Business Process Re-engineering	Implementation: Pilot or production System ?
1	Yes	Yes; Corel 4	Yes; RAD	BPR after WFMS implementation	Production
2	No	No	Yes; RAD	Integrated WFMS & BPR project	Pilot (1 office)
3	No	No	Yes; but informal	Integrated WFMS & BPR project	Pilot (15 users)
4	No	No	Yes	Integrated WFMS & BPR project	Pilot (1 team)
5	Yes	Yes	Yes; RAD	BPR prior to WFMS project	Pilot
6	No	No	Yes; informal	No Re-engineering	Pilot (1 location)
7	Yes	Yes	Yes	Integrated WFMS & BPR project	Production
8	No	No	Yes; prototyping	BPR after WFMS implementation	Production
9	No	No	No	BPR after WFMS implementation	Production
10	No; very informal	Yes	Yes; prototyping	BPR prior to WFMS project	Pilot (3 tasks)
11	No	No	Yes; JAD	Integrated WFMS & BPR project	Production
12	No	No	Yes; but informal	BPR after WFMS implementation	Pilot (1 area)
13	No	Yes; BDS & IDEF	Yes	BPR prior to WFMS project	Production
14	No	No	Yes	Integrated WFMS & BPR project	Production

**Table 4: The level of organisational support in WFMS projects**

Interview No.	Senior Management		Business Users	
	Commitment	Participation	Participation	Primary Roles
1	Yes	Yes, until sponsor changed	Yes; throughout	Design of workflows; requirements specification
2	Yes	Yes; mainly from IT	Yes; every step of the way	Design of workflows; design feedback / sign off
3	Yes	Yes; mainly from operations	Very active participation	Requirements specification; design feedback / sign off; testing
4	Yes	No	Yes; The users owned the project	Developed procedures; project management; training; change management
5	Yes	Yes	Yes; users seconded onto project team	Design of workflows; prototyping; testing; system champions
6	Yes	Yes;	Yes; especially managers	Requirements specification; design feedback / sign off; testing
7	Yes	Yes	Yes, very	Developed procedures; prototyping; change management
8	Yes	Yes; as and when required	Yes, very active	Design feedback / sign-off ; testing
9	Yes	Yes	Yes; extensively	Requirements specification; testing; change management
10	Yes	Yes	Yes; all grades	Requirements specification; testing; system champions
11	No	No	Yes; very active	Developed procedures; design feedback / sign off; testing
12	Yes highly evangelistic	Yes	Yes; very involved	Requirements specification; design feedback / sign off; testing
13	Yes, especially at outset	No	Yes, on a daily basis	Requirements specification; design feedback / sign-off; testing
14	Yes	Yes; via steering committee	Yes; heavily	Requirements specification; walk-throughs; prototyping; testing

**Table 5: Success factors for the implementation of WFMS**

Success factor	Score
User Participation	13
Senior Management Commitment	12
User Commitment	11
A Clear set of Objectives	10
Senior Management Participation	4
Realistic Budgets and Time-scales	4
The application of BPR	3
Selection of appropriate development approach	1