



Codifying, Managing, Archiving, and Disseminating Intellectual Assets: The Next Generation of the In-plant Print Center

A survey of in-plant print facilities and the emergence of Knowledge Management
within their parent organizations

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Introduction

Peter Drucker (2001) wrote that a post-capitalist society requires a collaborative and unified organizational force that can rally around centralized foci consisting of vision and total commitment to values, excellence, and mutual respect (p.289). In the quagmire of changing, eclectic, and highly diversified organizations, engaging in unified organizational collaboration is an extremely challenging directive. As organizations propel forward in the globally competitive waters—for-profit and non-profits alike—their ultimate successes depend upon the leadership and constituency empowered to make strategic and informed decisions.

The catalyst to making informed decisions is centered around the very knowledge and information made available to decision makers. Such information can exist in the form of printed material: reports from quantitative and qualitative studies, historical documents, research papers, financial prospectuses, news articles, industry-related articles, whitepapers, or marketing collateral posted on a wall. Other forms of information are transferred through an electronic medium such as Microsoft Word™ documents attached to email, PDFs archived in a personal or centralized repository, corporate images stored on a CD, marketing collateral presented in the form of a DVD or streaming video made available through an ASP (application service provider). Traditionally, the majority of this information—as presented through some sort of visual media—is produced, purchased, and/or disseminated by a progressive internal organizational printing or reprographics unit.

In a traditional organization, many categories of information would be sent to a localized printing facility (the in-plant center) for the purpose of mass reproduction and dissemination. Most output is generated either through conventional means (offset lithography, etc.) or digitally through equipment such as ink jet printers, laser printers, and other forms of toner devices. However, as technology has improved and costs declined, more and more offices within the organization find it easier and more convenient to purchase MFDs (multi-functional devices) to output documents, thus reducing their reliance on the in-plant printery (Vines, 2004). Additionally, as bandwidth and server space increase, so has the size and number of electronic documents passed through email transactions, posted on websites, or placed into accessible electronic archives thus reducing print volumes or eliminating print altogether.

The in-plant center has evolved to become a knowledge disseminator—a primary unit within a parent organization that provides value by enhancing the process in which knowledge is communicated through means of printed media containing information and data relevant to those employed within that organization (Vines, 2006). This fact, however, remains unbeknownst to the very hierarchy that drives the organization because in-plant print centers find it difficult (on the whole) to communicate with executive level management (Vines, 2006, Klasnik, 2005). Similarly, the role of the in-plant print center has been experiencing a slow paradigmatic shift. In the past, the in-plant print center placed primary concern on placing marks on paper. It has, however, effectively learned to utilize technology in which to archive and manage files (and images) and provide additional services to their customer base in the form of file access for reprint needs. Where in-plant print centers are generally lacking is in their ability to tag, archive, manage, and make accessible to their organization all files, images, data, and content that passes through them. As innovative and progressive knowledge management initiatives begin to take place in prominent institutions around the world, the in-plant print center should assume a more prominent role in the archival, categorization, and dissemination of knowledge through collaborative projects involving information technology (IT) departments, records management, marketing and public relations, library services (where applicable), human resources, education and training.

Executive Summary

The in-plant print community has experienced major changes in the way they do business and in the types of services that they provide for their parent organizations. Because of in-plant closings and refocusing, digital printing hubs have emerged to provide the reprographics needs of the organization often commandeered by the Information Technology division. With an impending need to manage files—electronic and hard-copy alike—innovative organizations have researched the progressive opportunities afforded through document and content management systems that fall under the auspices of the Knowledge Management (KM) movement. Through both quantitative and qualitative research, this study surveys in-plant print centers and provides valuable insight to the future of this particular sector in a rapidly changing industry.

Background

This study was facilitated by faculty and students at the California Polytechnic State University in San Luis Obispo, California. Individuals that conducted the research were Kenneth L. Macro, Jr., assistant professor in the Department of Graphic Communication, and two undergraduate students majoring in Graphic Communication; Johnson Chan and Emily Palmer. The research was conducted in April through June of 2006.

Objective

The objective of this study was to first survey in-plant printing facilities on their understanding of document, content, and knowledge management. Secondly, it was to gain a better perspective as to what active (and/or proactive) role an in-plant print center takes within their parent organization when it comes to document, content, and knowledge management initiatives.

Approach

This study was conducted through an electronic survey and personal interviews between April and June 2006. Because the listserv databases made available to the research team were predominantly more education/university oriented, much of the result leans towards that particular sector of the industry. More clarification of this process is available in the *Research Methodology* section of this report.

Summary of Key Findings

Our study resulted in the following findings:

- 1. The in-plant print community, as a whole, is in deficit with respect to understanding knowledge management (KM), content management (CM), and electronic document management (DM).**
For in-plant printing centers, generating output has become secondary to managing output that has, in turn, sparked an evolutionary movement to re-engineer knowledge processing, documentation, and archival. Such movements, conversely, place immediate attention on the elimination or streamlining of document output processing. Unfortunately, the vast majority of in-plant print facilities are unaware of or uninterested in the growth opportunities afforded by KM, CM, and DM initiatives specifically developed to address these issues.
- 2. Without a clear understanding of KM, the in-plant print center does not have a primary or definitive role in their parent organization's KM initiative.**
Organizations continue to investigate ways in which to eliminate costs associated with print. As a result, there has been a movement to develop highly-effective integrated

processes that streamline the capture, storage, and dissemination of corporate knowledge initially existing in the form of documents. However, the in-plant print center has had very little involvement (if any) in the planning and/or implementation of its parent organization's enterprise knowledge management (KM) initiative.

3. IT is a prominent partner in the in-plant print center supply chain, but not closely aligned.

IT divisions are usually primary players in the development and implementation of an organizational enterprise-wide knowledge management initiative. Because of natural dichotomous relationships formed between IT and the print center, the print center is often viewed as a non-IT function casting a secondary importance level on the value that it adds to the organization as a whole. As a result, the in-plant print center is most often excluded from the developmental phases associated with any sort of KM initiative. The emphasis placed within this forum is for the in-plant center to form a strong alliance with IT, assuring the involvement of the in-plant print center in design or post-developmental discussions.

4. Some in-plant printing centers see value in strategically and collaboratively partnering with intra-organizational departments in the area of KM, CM, and DM, but do not believe that they should emerge as the primary leader of such initiatives.

Many in-plant print centers faced with reduced print volumes, tight budget constraints, and mandates to reduce costs through production efficiency planning, have a desire and vision to differentiate their service offerings throughout their parent organizations. They generally lack understanding, personnel, and inter-corporate leverage, however, and thus do not emerge as a prominent leader in an organizational KM initiative.

5. Only a small minority of in-plant print centers have installed or are researching an enterprise-wide electronic DM system to be used by their parent organization.

As documents continue to be authored, tagged, archived, and disseminated electronically, it is highly significant for an in-plant print center to emerge as a document archival repository thus placing lesser importance on the output and greater importance on file storage and content management. This report will provide some examples of successful in-plant print centers that have taken a stance to champion the management of knowledge—in the form of documents—within their organizations.

Conclusions and Implications

Although the research focused primarily on in-plant print facilities, the data—as well as conclusions—are extremely apocalyptic to all purveyors of print, those who specialize on placing ink on paper and those who place great importance in output volumes. The digital revolution is in full swing, it has inundated organizations with a phenomenal wealth of knowledge that has paradigmatically sparked a new outlook on the way documents—the carriers of knowledge—are produced and ultimately disseminated. This study brings awareness to the very real and complex issues currently challenging in-plant print centers around the world and most importantly (with some irony) it exposes a gaping hole in the leadership of educational institutions and their inability to congeal collaborative progression in the area of managing knowledge.

Research Methodology

Electronic Survey

The research findings consist of data gathered through an electronic survey service called SurveyMonkey.com. The survey was disseminated to members and subscribers of several listservs belonging to in-plant printing organizations residing in the United States, the United Kingdom, Australia, and New Zealand for a total population of 2,212 (n = 2,212). The survey generated 81 responses (a 3.7% response rate). The breakdown of responses is as follows:

Country		
USA	76.5%	(n=62)
United Kingdom	16.0%	(n=13)
Australia	4.9%	(n=4)
New Zealand	2.5%	(n=2)

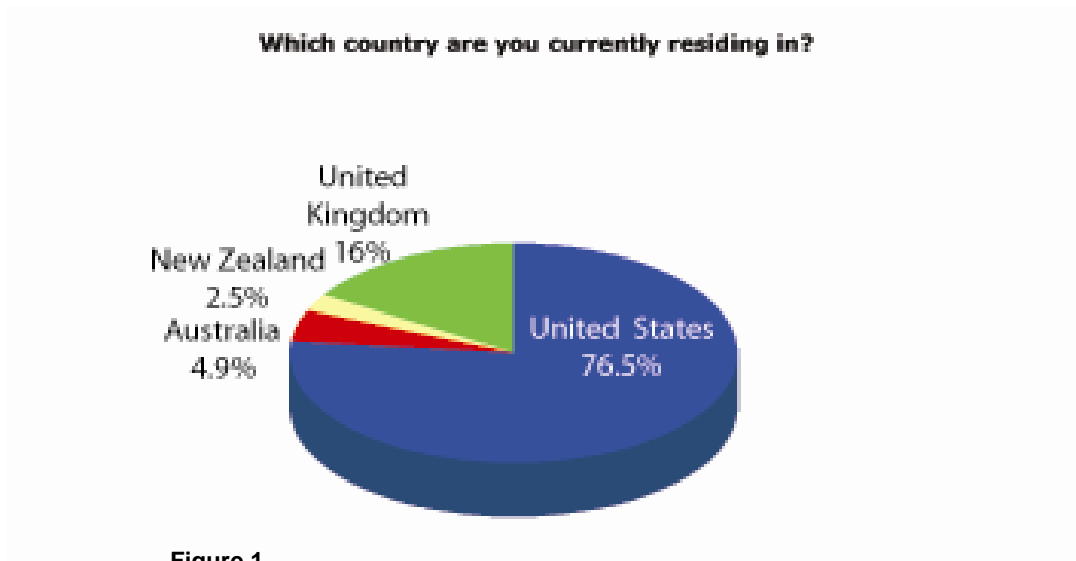


Figure 1

Classification		
Education	74.4%	(n=58)
Other	10.3%	(n=8)
Government	3.8%	(n=3)
Commercial Financial Services and Insurance	3.8%	(n=3)
Commercial Pharmaceutical and Health Services	3.8%	(n=3)
Commercial Manufacturing	2.6%	(n=2)
Professional Services	1.3%	(n=1)
Percentage who skipped the question	3.8%	(n=3)

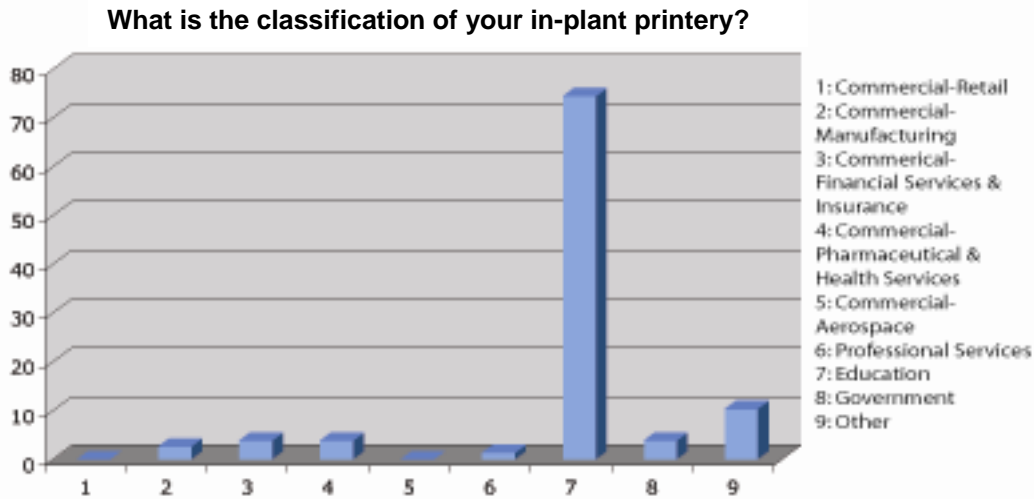


Figure 2

Questions were developed using a 5-scale Likert template that rated each participant's view on particular issues regarding content management, document management, and knowledge management. Basic demographic information was collected as well. The survey was approved by the University Human Subjects Committee and the participant's names were marked optional and acknowledged as confidential.

Personal Interviews

From the electronic survey responses, ten participants were selected to be interviewed via telephone. Because of scheduling conflicts and time zone constraints, only six out of the ten affirmatively responded to the interview requests. The six interviews consisted of senior-level management of in-plant printing facilities representing the educational sector, which was the sector comprising a large majority of the responses generated from the survey.

Study Participants

The electronic survey was made available to and completed by managers and directors of in-plant print facilities whom subscribe to listservs associated with the following organizations:

- Association of College and University Printers (ACUP)
- In-plant Printing and Mailing Association (IPMA)
- University Print Management Group UK (UPMG)
- Network of In-house Print Professionals of Australasia (NIPPA)

Interviews

- University of Waikato, Waikato, New Zealand
- University of Canterbury, Canterbury, New Zealand
- Glasgow Caledonian University, Glasgow, Scotland, UK
- Louisiana State University, Baton Rouge, Louisiana, USA
- University of Missouri, Columbia, Missouri, USA
- Oregon State University, Corvallis, Oregon, USA

A completed report consisting of summaries pertaining to each question asked in the electronic survey, along with of a listing of the qualitative questions used in each personal interview, are placed in an appendix for this report which is a separate document.

Detailed Findings

The survey data provided valuable and interesting insight into the research topic. There were five significant findings drawn from the data and set as the keystones for the study. They are discussed in further detail below.

Keystone #1

The in-plant community, as a whole, is in deficit with regards to an understanding of knowledge management (KM), content management (CM), and electronic document management (DM).

Background

Over the past 20 years, organizations have spent a significant amount of time and invested great resources in evaluating core competencies. Plagued with eliminating cost centers that are not key to the overall mission of the parent organization or financially self-sustaining (those that charge internally for their services offered), many in-plant printing centers have been dissolved or outsourced. In fact, over 4,800 U.S. in-plant print centers have closed since 2000 (Klasnik, 2005). Klasnic (2005) attributes these closures primarily to; 1) management's inability to understand the in-plant print center because of poor communication from the in-plant print center; 2) the in-plant print center not being closely aligned with the organizational mission; and, 3) the print center not being involved with "outside challenges." These outside challenges refer to non-traditional services and venues perhaps offered by outside entities that could be other organizational departments or external vendors. The in-plant print facility's inability to strategically align themselves with key organizational administrative initiatives leaves them vulnerable for re-organization, downsizing and/or closure.

As printing technology continues to become faster, better, and cheaper—as in the case with the development of the desktop color MFDs (multi-functional devices) which scan, archive, print and fax electronic files—centralized printing centers with highly capitalized high-speed digital black and white laser printers will become overly complacent. In-plant print facilities tend to place much of their strategic planning efforts on the acquisition of capital-intensive printing equipment (both conventional and digital). Although a great deal of their work requires high speed, high quality print production options for the prominent collateral produced for their parent organization, quite often, the storage of electronic files—the very files that are electronically processed through the production cycle—are rendered secondary to the process. The files are stored on some sort of electronic media (e.g. CD, DVD, Zip, or HD) under a client's name or as a job number. The file can be saved as a PDF and made available to the client. The client, however, either generates the PDF themselves or receives it from the designing agency. The real challenge becomes evident when the client asks to have access to the original file, or another department in the organization makes a request to review a file from a few years back; and the print facility is unable to retrieve it because of insufficient filing practices. The real travesty here is that the file, complete with pertinent information and applicable resources only exists in paper form after it leaves the in-plant print facility. Why doesn't the electronic file automatically get tagged and archived in a centralized organizational repository that is managed by the in-plant print center? Why can't a member of the organization search and retrieve all of the files associated with the creation of a distributed document via the organizational web portal for future reference? These are the questions that plague the in-plant print center and often remain unanswered.

Survey Results

In question Number #23 of the survey, the participants were asked to choose an answer that best described their parent organization's involvement in KM initiatives based on five statements (see Figure 3). The statements were:

1. Our organization has completed at least one KM project.
2. Our organization has not completed a KM project, but we are in the process of working on one.
3. Our organization has not started on any KM projects, but we (the in-plant) are considering it.
4. Our organization is engaged in a project but we are not part of it.
5. I have never heard of KM before.

Ironically, 49.2% of the participants report that they had never heard of KM. This statistic clearly identifies a huge deterrent in the movement to bring in-plant printing centers to the forefront of knowledge management initiatives. Additionally, there are great discrepancies with regards to clear definitions of knowledge management, content management, and document management as discussed in "Implications."



Figure 3

Discussion about Knowledge Management

Although there are many definitions and schools of thought surrounding knowledge management, we have decided to work exclusively with Davidson and Voss's (2002) working definition. They write, "In the real world, what matters is that knowledge management is about creating competitive advantage from the intellectual assets available to your organization" (Davidson & Voss, 2002, p.31). Without getting lost in a great debate about traditional and non-traditional, corporate and academic versioning of the definition, it is essentially about working better by working smarter with the knowledge and personnel at hand.

Document Management and Content Management

Document Management and Content Management are two concepts that are often interchanged without thought, however, they have very distinct meanings. Document management refers directly to the generation, archival, retrieval, dissemination, and termination of documents as they initially exist. However, organizations—assessing the finite quantity of existing documents (both electronic and paper) available to the organization—have begun to realize that there must be a process enacted to manage the documents primarily in an electronic form (Vines, 2004). As a

result, document management firms have evolved to assist organizations in transferring their paper files into electronic files through scanning and archival systems. This places every document in existence to the company in a centralized repository made available to all personnel in the organization in need of information, data, and, most importantly, knowledge.

Content management, in contrast to document management, looks at the content as objects or metadata. Generated from the development of intranet publishing, content management appropriately tags and classifies content for easy electronic searching (Vines, 2004). By typing a topic in a field, a search mechanism can quickly search through millions of files and retrieve the most appropriate documents that provide insight to the chosen content. Essentially, content management is a publishing process for managing objects that exist in a document or other vehicle for displaying data and information.

According to Vines (2004), "Historically, these two domains of practice have remained quite separate. The demarcation has been based on different mark-up practices. Document management primarily involves the use of visual mark-up that is enshrined in software systems such as word processing and publishing packages. In contrast, content management systems have drawn in structural mark-up practices that have arisen from the use of Standardized General Mark-up Language (SGML) and now *eXtensible* Mark-up Language (XML)" (p.54).

In the survey, 45.2% of the respondents reported that their parent organization is currently engaged in a document or content management initiative. Twenty-six percent responded that their parent organization is not engaged in a DM or CM initiative. Twenty-eight percent responded "I don't know" (see Figure 4). There was no clarification between the two terms, nor were they asked to provide any details regarding to the type of initiative, so there is no way of concluding if the two terms were understood by the respondents.

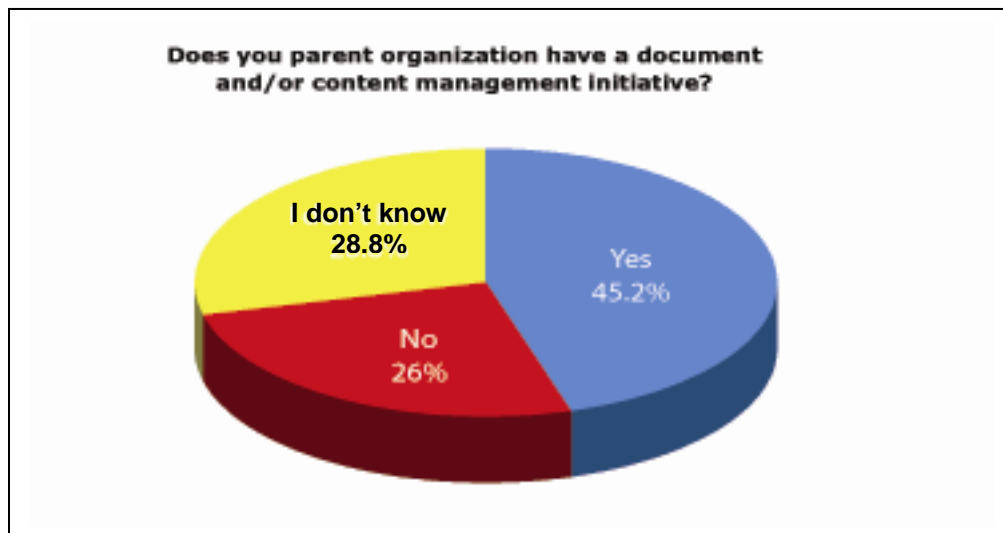


Figure 4

Implications

It is clear that an aggressive educational campaign in the areas of knowledge management, content management, and document management would provide significant benefit to the in-plant print community. A campaign that highlighted in-plant print centers that have successfully engaged in a productive document management and/or content management initiative would provide valuable insight to an in-plant print center in need of clarification, vision definition, and implementation planning.

One respondent anonymously wrote in an open-ended comment field, “The terms are probably not well explained and are often interchangeable. This causes confusion amongst those not well versed in the nuances of such an initiative. It is a fundamental need – the alternative is the loss of critical Intellectual Property. That is the currency we trade in.” Assuredly, a clear understanding of knowledge management, content management, and, document management is a future imperative for the success of the in-plant print center. Having these words within the collective lexicon of the in-plant print center employee constituency will be highly beneficial to some degree.

Keystone #2

Without a clear understanding of KM, the in-plant print center does not have a primary or definitive role in their parent organization's knowledge management initiative.

Background

Richard Vines (2004) writes,

It is proposed that the valuable in-plant (print center) is one that encompasses all the characteristics of an effective in-plant operation but moves beyond traditional printing activities. This can involve a transformational shift towards digital imaging and all types of output management, including electronic rendering and all types of variable, digital and offset printing. The substantial argument of this whitepaper is that in-plants need to move beyond simply fulfilling the function that is expected of them by their host organizations. On the contrary, they should position themselves as contributing to the creation of a new operating paradigm for the host organization – one that best manages and exploits all of its knowledge assets.

(Vines, 2004, p.22).

A knowledge management initiative is nothing without a precise understanding of how knowledge is captured, archived, and disseminated. The in-plant print center is an ideal hub for assessing this information for it is where documents are printed and output is generated. It is where data is merged onto paper and then mass disseminated to designated end-users. Therefore it is imperative that the in-plant printing facility become educated in knowledge management practices and principles and assume a substantive role in the progression of an effective knowledge management initiative (see Figure 5, below).

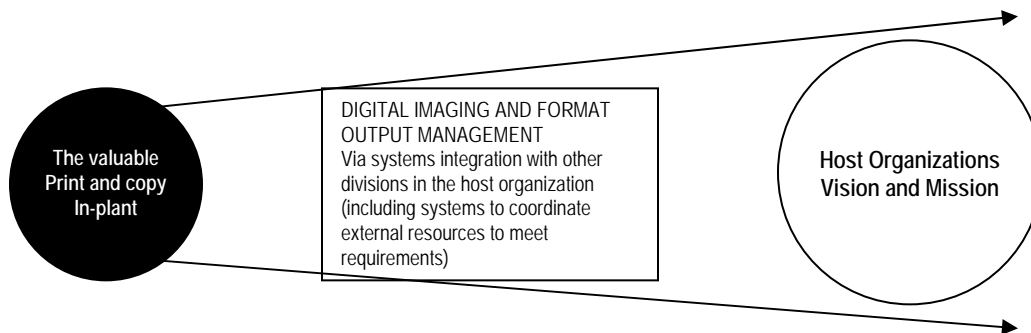


Figure 5: The Valuable In-plant (Vines, 2004). Reproduced with permission from author.

Survey Results

According to the survey, 34.4% of the in-plant print centers report that their parent organization has a knowledge management program in place. 32.8% do not have a program. 32.8% do not know if their parent organization has a KM initiative at all (see Figure 6). Additionally, 45.2% of the respondent's parent organizations have or are currently implementing a document management or content management initiative. Over 28% reported that they are unaware if their organization engages in a DM or CM program. Interestingly, on a side note, over 20 respondents did not answer the questions. It is difficult to determine why the respondents skipped the questions, but it may be inferred that they were unfamiliar with the terms which further substantiates the findings.

Does your parent organization have a Knowledge Management (KM) initiative?

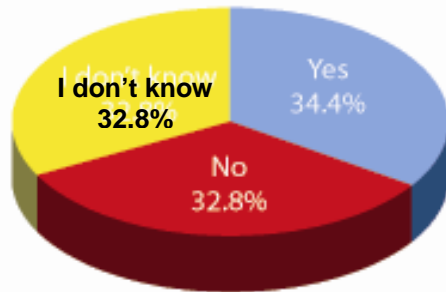


Figure 6

Similarly, over 78% of the in-plant print facilities surveyed do not have a role of any kind in a knowledge management initiative within their parent organization. 21% report that they have some role within the knowledge management initiatives engaged in their parent organizations (see Figure 7). Lastly, over 52% of the respondents believe that their parent organization should initiate a knowledge management program, whereas, 3.3% believe that their parent organization should not engage in a knowledge management initiative, and, 44.4% do not know if their parent organization should engage in a knowledge management initiative (see Figure 8).

Does your in-plant have a role in a Knowledge Management (KM) initiative?

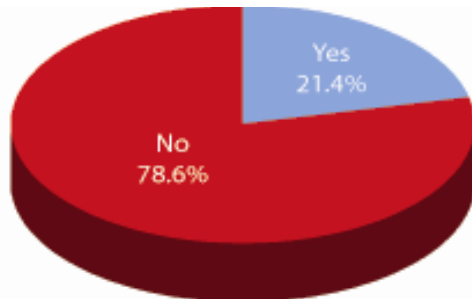


Figure 7

Do you see a need in your parent organization for a KM initiative?

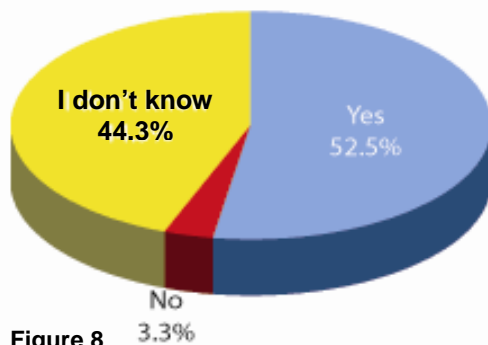


Figure 8

Implications

As a whole, enterprise-wide communication is still fundamentally channeled through some form of printed media (Vines, 2006). The communication venue is an integral part of the knowledge transfer process. Standard Operating Procedures, safety manuals, quality assessment protocol, performance metrics, and other tools made available to the organization via visual display boards all provide transferable knowledge to those in need. The statement posted above remains a double-edged sword. Whereas the in-plant print center is ill-informed of the necessities of managing knowledge and all of the components associated with an organization's knowledge domain, so too is the design team that chooses to exclude the in-plant print center from the implementation plan. Many executives fail to see the sheer importance of the in-plant print center as an electronic document generating hub. Vines (2006) writes, "Because print is being redefined as an element of document workflow service, conversations about the strategic management of print need authorization from the highest levels" (p. 18).

Regardless, the in-plant print center must quickly adapt to a changing milieu. "There is a responsibility for in-plant managers to involve themselves into the KM, DM, and CM space", says Wayne Riggall (2006), "DM being the management of systems and document artifacts; CM including other media like digital videos and such; and, KM being the mining of those resources to start to apply solutions to business problems." Once such a strategy is defined, the in-plant print center will strengthen its ties within the organization and emerge to be foreseen as a value-added contributive component to the future progression of the organization.

Keystone #3

Information Technology (IT) is a prominent partner in the in-plant supply chain, but not closely aligned.

Background

Since World War II, the in-plant print center has become a valued organizational component destined to address the organization's printing needs including forms, letterhead, stationary, business cards, and other administrative collateral. Strictly a conventional offset operation—in most cases—with some photo-copier technology (since the 70's), the facility required very little interaction with other internal departments because it was the primary and designated center for acquiring prints and copies. However, as digital printing emerged, and high-end campus networks began to develop, in-plant printing facilities watched the development of mainframe high-volume batch-driven data printing centers emerge and, consequently, their print volumes decline. These centers were often commandeered by powerful IT divisions that were quite skilled in understanding programming languages and administering complex data networks. Fortunately, many in-plant print facilities—forced to comply with organizational needs and demands—developed casual relationships with IT departments and installed high-speed networked quality digital printing devices. As a result, these casual relationships created distanced interactions between the two entities whereas, network administration duties and digital printer installations were facilitated by IT and printing by the in-plant print center.

Today, both in-plant print centers and IT divisions have morphed into a vast and complex state of digitization. In-plant print centers, on a whole, receive a majority of their files electronically, through an intranet or the Internet. Additionally, with the significant amount of personal computers and networked printers (not to mention servers) connected to the infrastructure, IT personnel are plagued with maintaining corporate networks and server space. Consequently, IT has evolved to become the favorite child of the parent organization, meaning, the services that they provide are perceived to be instrumental to the continuance and existence of the entire organization. This is not the case with the in-plant print center. As mentioned in the beginning of this paper, the assessment of value associated with the in-plant print center is slowly deteriorating as print technology becomes faster, less complex, and more affordable and thus decentralized.

From strictly a knowledge management perspective, both networked computers and printers alike provide real value in their ability to archive and retrieve vast amounts of data and content. This technology alone has improved the efficiency of knowledge transference and dissemination (Daveport & Prusak, 2000). Hence, a proximal alignment with an organizational IT division would be a significant political boost for the in-plant print center and would assure that in the emergence of a KM initiative, the in-plant print center would assume a role in the future plans and possible design of the program.

Survey Results

Collaborative involvement with organizational divisions is an imperative for the success of any progressive in-plant print center. By developing strategic alliances with other departments that maximize the in-plant's service offerings, the in-plant print center has a greater presence and stronger tie to the organization as a whole. As the survey shows, a majority of the respondents (64.8%) have developed strategic relationships with their parent organization's marketing and public relations division. IT Services was the second strongest division reporting in at 56.3%. When asked how often the in-plant print center communicates with their corresponding IT Department, 33% (the majority of the 56.3%) responded "Every few days." Survey participants were asked if they contract IT services or employ their own IT technicians and 51.5% employ their own IT personnel, 11.8% contract IT service personnel and, over 36% both contract and employ IT services (see Figure 9, below).

Are the IT services you utilize contracted or do you employ IT personnel?

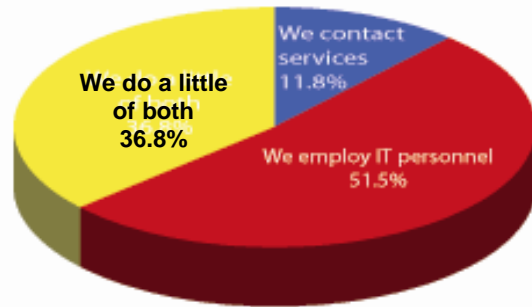


Figure 9

Implications

Let it be noted that the impetus to question posted above is not to promulgate that the IT division of a parent organization be the sole champion and distinctive leader of a progressive KM initiative or CM/DM initiative. The purpose, rather, is to advocate that in-plant printing centers develop cohesive and collaborative bonds with IT services, data centers, and records management personnel in order to politically align the in-plant print center with the core mission of the parent organization and emerge as a value-added component of the operation. Output devices (i.e. laser and ink-jet printers, wide-format printing, CD/DVD ROM duplicators) and input devices (i.e. high-end multiple-paged scanners, wide-format scanners) are viable technologies reflective upon a successful in-plant printing production center. The products produced from the in-plant printing center all contain content, which, when applied in context, becomes knowledge. This knowledge—existing in some form of electronic media—can be archived, tagged, classified, disseminated, and, made accessible to chosen personnel via an electronic agent such as a Web portal. This is a KM function that requires great attention. If the in-plant printing center fails to take this on or partner with IT, then they will be left behind.

Keystone #4

In-plant printing facilities see value in strategically and collaboratively partnering with intra-organizational departments in the area of KM, CM, and DM, but do not believe that they should emerge as the primary leader of such initiatives.

Background

James Sena and Rami Shani (1999) write in the *Knowledge Management Handbook* (Liebowitz, 1999):

Knowledge management presents significant organizational and technical challenges that require the integration of an effective human network with a wide range of technological opportunities (Lloyd, 1996). In order to achieve this task new skills, new mindsets and models, organizational commitment, and new ways of thinking are required.

(Sena & Shani, 1999, p. 8.1)

A knowledge management initiative must be developed and implemented by a vast array of personnel and expertise. The process of leveraging knowledge is ultimately demonstrated by the way these collaborative pools of people—representing many disciplines within the organization—form a strong and cohesive team. This team, in turn, is only as successful as the team's ability to come to terms with indifference, enhance each other's skills, and, most importantly, develop an unprecedented synergy in order to implement, maintain and sustain a knowledge management initiative (Abel & Oxbrow, 1999). This is why it is so important for the in-plant print center to, at the minimum, be part of this team and assist in the design and implementation of the knowledge management initiative which could include a document management and/or content management stratagem. For the in-plant print center to emerge as the primary leader is perhaps unrealistic. However, for it to emerge as an energized division that champions a knowledge management movement within a progressive organization is momentous and politically engaging.

Survey Results

Electronic Survey

At the end of the survey each participant was asked to share their thoughts on what they believed to be their role (as an in-plant print provider) with regards to KM, DM, and CM. The following comments exhibit the great differentiation between schools of thought regarding this subject matter. The statements below are only a sampling of those taken anonymously from the survey (2006):

"The in-plant should take a somewhat proactive role, however should not be the owners of KM. Our role currently involves the archiving and retrieval of documents for on-demand production. The wider role should be owned by the records management department with absolute senior executive support. The in-plant can be one of the players in this enterprise wide strategy."

"I don't think we should be the owner of this process, however, we could be a contributor and/or supporter."

"I feel that it would be better handled by IT."

"No role at all."

"The in-plant should become as knowledgeable as possible and should partner where KM is in place should lead where KM is still unknown."

“What better place for it to be? IT is in the business of hardware and keeping it running. Printers are in the business of creating copies and making them available for those who want them.”

“I think it would have to be a collaborative effort with IT, Records Management and the in-plant. The role of the in-plant could be the scanning of older documents, while the IT and Records Management help departments move forward with scanning the current material.”

According to the survey, 50% of the respondents believe that a document management and/or content management initiative should be initiated by the organization’s IT division. Only 26.7% responded positively to the in-plant printing center initiating the service (see Figure 10). This statistic further substantiates the need for the creation of an awareness campaign to educate the in-plant industry in the areas of knowledge management principles and practices.

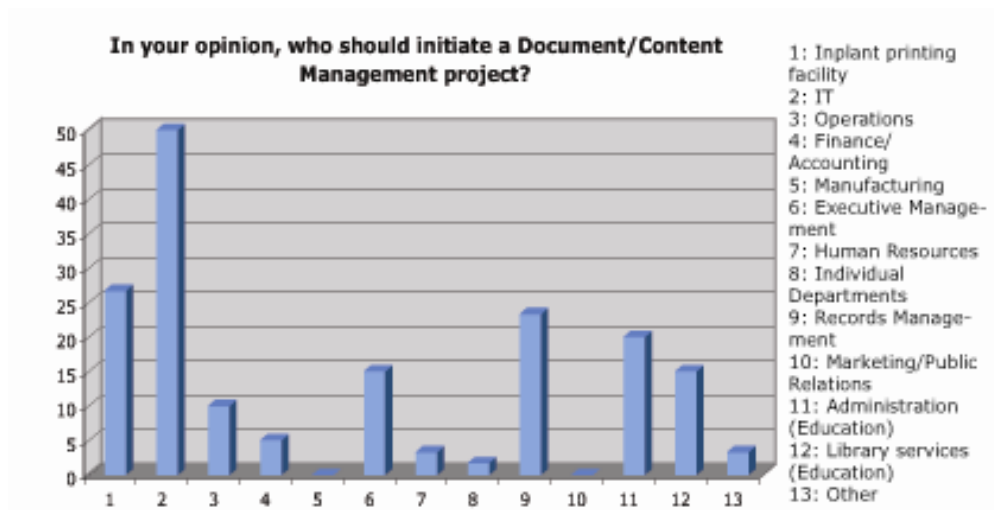


Figure 10

Qualitative Interviews

Six top directors from small, medium, and large in-plant printing organizations from universities across the United States, United Kingdom, and New Zealand were contacted and interviewed for this research project. Representing the educational in-plant print sector exclusively, the issues faced by other sectors are likely to be very similar and applicable. It should be noted, however, that the researchers of this study propose that the responses made in the following assessment do not necessarily represent the thoughts and ideologies of in-plant print centers from other sectors.

The United States

Three management level personnel from highly-respected state universities in the United States were interviewed via telephone during the research process of this project; Mr. Rick Wise from the University of Missouri-Columbia, Mr. Mike Loyd from Louisiana State University, and Mr. Jean-Luc Devis from the Oregon State University. Of the three institutions, the University of Missouri was the only university to report that they are currently engaging in a knowledge management initiative. Their in-plant print center, however, does not have a role in it. It is being led by IT Services with whom the in-plant print center has a cordial relationship, according to Mr. Rick Wise, director of Printing Services (Wise, 2006). Conversely, Louisiana State University does not have any initiatives being executed. According to Mike Loyd (2006), director of Graphic Services, a knowledge management initiative—especially one that involves document

management and/or content management components “would make everyone’s life easier, but nobody has been there to initiate it or wants to take this on.” Additionally, Mr. Loyd (2006) reports that because of the large and expansive size of Louisiana State University, the decentralized nature of the university lends itself to inconsistencies in database management, document management and content management. An electronic document management system, at a minimum, would provide a semblance of standardization and would provide significant benefits to the in-plant division (Loyd, 2006). Jean-Luc Devis, the director of Printing Services at the Oregon State University envisions some potential involvement with the in-plant print center in the area of document management and content management at their university. He believes, however, that IT will take a prominent proactive role in the initiation of such a movement. As a result, Jean-Luc does not have plans to implement a document management or content management initiative in the near future (Devis, 2006).

One commonality between the three divisions is their ability to send and retrieve electronic files via intranets and the Internet. All three have the capabilities to electronically receive files, process files, generate electronic proofs, and make them available to their designated clientele. They all have proprietary management systems that process and archive files viewable by the customers who submit them to the print centers. This application exists primarily as a digital storefront and has become a very integral tool in electronic and digital workflows (Wise, 2006). Additionally, all three directors feel that the in-plant print center would benefit from being engaged in or taking a role in an enterprise-wide knowledge management initiative. Unanimously, they believe that a KM movement should not be initiated or lead by an in-plant print division (Wise, 2006, Loyd, 2006, Devis, 2006).

United Kingdom

Andrew Scott (2006), head of Print Design Services at Glasgow Caledonian University in Glasgow, Scotland, reported that his division has been involved in initiating a campus-wide document management program for the past seven years. This initiative essentially originated when he and two other colleagues from the UK developed a job-submission system that automatically tagged and archived electronic files for easy access and retrieval. Although not fully implemented, the goal is to make it enterprise-wide. Mr. Scott believes that the in-plant print center should be the primary lead of this particular component (document management) and, that eventually, a content management program will become the primary focus on his campus (Scott, 2006).

New Zealand

At two universities in New Zealand, the vision towards knowledge management and the role of the in-plant print center is highly defined and engaged. Wayne Riggall, Print and Copy Manager for the University of Canterbury in Canterbury, New Zealand has a distinct understanding of the importance of the in-plant print center and the development of an enterprise-wide knowledge management initiative. While he has recently begun his employment with the University of Canterbury, he was previously the manager of Waikato Print at the University of Waikato. At Waikato, Mr. Riggall developed an advanced enterprise-wide image capture, document management, and print-on-demand system. As a result, Waikato Print evolved to become a premier model for in-plant print centers across Australia and New Zealand (Riggall, 2006).

At Canterbury, Mr. Riggall admits that the current status of the in-plant print center is 15 years behind what he developed at Waikato. At Canterbury, Mr. Riggall spent his first several months developing alliances with prominent divisions within the university structure including IT, records management, and Procurement Services. His vision is to champion and lead a fully integrated knowledge management initiative complete with an enterprise-wide document and content management system. Riggall (2006) posited, “Building a structure, accessibility to the systems, will take about three years to accomplish our goal at the University of Canterbury. However, for a wide cultural change throughout the organization to take full advantage of the system will definitely take much longer. It is like a field of dreams—if you build it, they will come” (Riggall, 2006). Lastly, Mr. Riggall believes that printers have to be the vision leaders when it comes to

knowledge management, content management, and document management initiatives. He commented, "IT is dragging the chain and needs vision leaders like printers to push them along. Printers are often skeptical of moving in this direction because of the void of inactivity. Somebody has to push the barrel a bit and start the discussion going" (Riggall, 2006).

At the Waikato University, Sally Sleight, Riggall's successor, held the position of knowledge management librarian prior to taking the helm of Waikato Print. Ms. Sleight alluded to the fact that IT services and Waikato Print have a close marriage in their day-to-day operations. They are currently engaged in a collaborative project involving the expansion of their document and content management system. Ms. Sleight envisions Waikato Print as the University's centralized hub for knowledge that would include the sharing, archiving, updating, and dissemination of information. She said, "Having an established knowledge management initiative would reduce the problem of having duplicate materials and/or outdated information. Using highly effective and industry-oriented applications, such as Xerox DocuShare (document management software application) and BlackBoard LMS (learning management system) Waikato Print has emerged as an efficient, value-added, integral component to Waikato University's mission and culture."

Implications

In-plant print centers in Australia, New Zealand, and the United Kingdom alike have experienced greater challenges than their United States counterparts in the areas of external outsourcing and facilities management. As a result, these challenges have expedited thought and strategies on how to improve the in-plant print center within the core of the organization and add value to the organization's mission. In Vines (2004) study, he reports, "Failure to address these strategic issues is likely to exacerbate the trend toward the pillarisation of workflow. This has the potential to further encourage the outsourcing or facilities management (FM) of multiple functional areas such as office printing equipment, photocopier fleets, offset printing and even IT functions" (Vines, 2004, p.3). Inevitably, the survival of an in-plant printing center requires great strategic planning and major reform that includes education in the area of electronic document management, knowledge management, enterprise publishing, procurement practices, and general workflow. This boost of adrenaline has already prompted studies such as Vines (2004, 2006) from industry support groups and in-plant print sector representative associations to begin the crusade to educate and encourage the masses to move into this evolving and innovative arena. Conversely, as exhibited from this survey, the United States in-plant printing sector has a great distance to travel and significant collateral damage to overcome before the movement is recognized and begins to be seen as an important strategic endeavor that will insure sustainability and, most importantly, endurance.

Keystone #5

Only a small minority of in-plant print facilities have installed or are researching an enterprise-wide electronic document management system to be used by their parent organizations.

Background

Aside from those in-plant print centers reviewed in Keystone #4, there were a handful of participants who reported that they intend to investigate the possibilities (or have already given some consideration) into the acquisition and implementation of an electronic document management system. In a case study reported by Kim Zimmerman (2002), The Public Utility of Texas researched, acquired, installed, and launched a rigorous electronic document management application that automated document processing and saved the utility hundreds of thousands of dollars. In partnering with InputAccel™, a carefully designed system integrated with carefully planned innovative solutions generated a robust application that generated an ROI (return on investment) of just under two years (Zimmerman, 2002). The success of this particular example is credited to the collaborative effort exhibited by many departments and personnel in the entire organization, including their document processing center (in-plant print center). *This is the kind of new-aged thinking that requires dedication, diligence, and fortitude. This is the kind of thinking that more in-plant print centers must learn to understand and progressively ignite within their very own organizations.*

Survey Results

Over 65% of the survey respondents believe that providing electronic document management services to their parent organization would be highly valuable and would strengthen their bond with the parent organization as a whole. Twenty-nine percent were unsure it would have any effect at all (see Figure 11).

Is an electronic Document Management system a service that you feel would add value to your inplant and strengthen your bond within the organizational hierarchy?

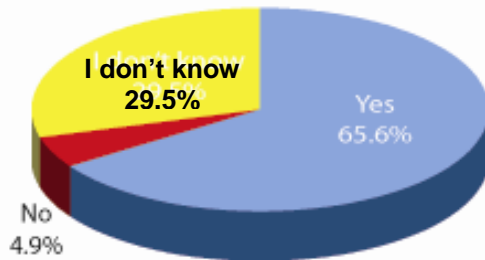


Figure 11

The following exhibits the result to the question, "Which of the following electronic services do you offer to your organizational constituency?" (see Figure 12).

Print on Demand	90.8%
Digital archiving	50.8%
Electronic file transfer protocol	33.8%
Database management	15.4%
Content management	9.2%
User access to warehoused files	9.2%
Other	9.2%
Web content management	6.2%
I don't know	1.5%

Which of the following electronic services do you offer to your organizational constituency?

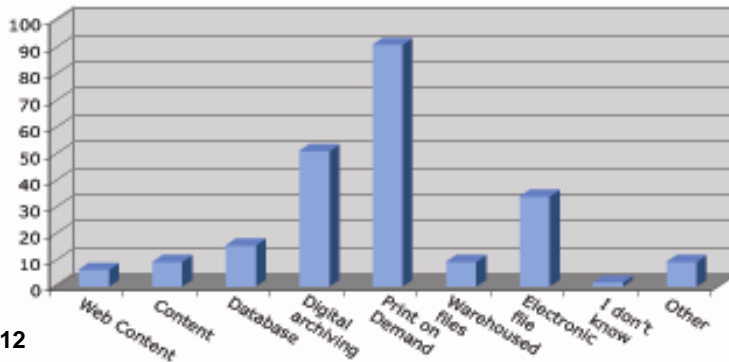


Figure 12

Although 75.4% of the in-plant print centers surveyed reported that they receive files electronically or offer an electronic file submission service, only 19.7% provide an electronic on-line search and retrieval service for archived images or documents that have passed through the print center. Additionally, 68.9% report that they offer networked printing services but only 8.2% provide digital asset management services in the form of database collections.

The survey data reported overwhelmingly that over one-third of the participants are not considering the purchasing of electronic document management system and, 15% report that they have purchased an electronic document management system. Additionally, 23.3% report that although the in-plant print center has not purchased a system, someone else within their organization has purchased a system.

Implications

There are many case studies of organizations that have successfully begun a knowledge management movement simply by starting with an electronic document management system. The overwhelming results from these successful case studies report that organizations have witnessed significant decreases in processing times where they have automated manual centers, provided easy simultaneous accessibility to documents that reside electronically, eliminated long searches once associated with paper file retrieval, reduced human error as a result of contained automation and, generated significant cost savings as a result of the project execution. They have also seen additional cost savings take place in various other departments associated within the organization (Zimmerman, 2002, p.16.9). The bottom line is that imaging technologies (scanning and document processing) already exist within the confines of the in-plant print center. With this technology, it is up to the in-plant print center to further their holdings within the core of the organization by providing valuable insight into methods and strategies that can improve processes and workflows and contribute to the efficiency and profitability of the entire organization.

Conclusions and Implications

An organization requires a competitive advantage in order to survive in a modern economy. Period. No one can argue that by not having a competitive advantage one can assume sustainability in financially non-competitive bliss. Ask Gateway Computer, American Motors, Independence Air, or Pillans & Waddies Printing. An organization is as strong as the knowledge which it possesses and leverages. Of course, most organizations do not know what they know, which—in turn—renders them competitively disadvantaged.

This study provides enlightenment to a business sector faced with great technological and political challenges—challenges that will leave many disadvantaged. The findings from this study highlight an increased need for education and advocacy in the in-plant sector for the involvement and, possibly, championing of knowledge/information driven initiatives within their very own organizations.

- The in-plant sector is greatly disadvantaged when it comes to understanding the makings of a KM initiative, let alone, the vision to engage in one. An awareness campaign geared towards the in-plant community is imperative.
- The study showed that the role of the in-plant print center is considered to be tertiary (or non-existent) in the development of a KM initiative from the organization's perspective, which breeds additional reasoning for rousting about advocacy for involvement of the print center.
- The visions set forth by IT and the in-plant print center are not closely aligned. IT looks for ways to maximize technology for the sake of distributing information. In-plant print centers look for ways to make marks on paper. For the in-plant to survive, they must look beyond the substrate and look for new and innovative ways in which to store, track, tag, and archive files—for a start. IT has expertise in this area and can provide the needed assistance to launch successful applications in multiple phases of progress.
- The in-plant print community, acknowledging value in providing a multitude of KM services (document and content management, collaborative knowledge sharing applications, etc.), generally believes that an initiative of this nature is highly rigorous and would not be best championed by the in-plant print center.
- Only a modicum of in-plant print centers have assumed the initiative to research, acquire, install, and/or manage an enterprise-wide electronic document management system for their parent organizations. This is especially true in the United States where in-plant print centers still based their existence on a business production philosophy (clicks and paper volume) and not a marketing philosophy (knowledge dissemination, value-added interdepartmental partnering, customer relationship management, and efficiency planning).

After acknowledging the vastness of these keystones, the question arises, "How does this all come to fruition?" Enter knowledge management. We determined earlier that knowledge management is essentially a system or process to enable organizations to capture knowledge, experiences, and creativity in order to improve personnel performance (Davidson & Voss, 2002). Document management and content management are merely tools that assist systemically in the possible capture, archival, organization, classification, and dissemination (or accessibility) of knowledge in the form of information and data. Although there is much scholarly debate and academic research attributed to the subject of knowledge management, for reasons of simplification we will focus primarily on the fact that knowledge is an asset. Knowledge is often misunderstood or cast aside because of biases, prejudices, or—ironically—stupidity. According to

Davidson & Voss (2002) there are five common symptoms that organizations exhibit when they manage knowledge poorly.

1. Knowledge creation, knowledge transmission, and knowledge use continually remain unstructured. In a poorly managed facility, creativity is stifled, communication is limited generally to certain managerial levels, and knowledge is infrequently shared by those within the organization.
2. Most often decisions are made without having the best or current information made available to the organization.
3. Personnel employed within an organization are consistently barraged with “information” passed onto their desks in the form of memos, reports, emails, and emails with attachments, e-Newsletters, etc. This bombardment of “data” actually confounds, and consequently, detracts staff from doing their job.
4. Knowledge is most often never captured from personnel employed in the organization. Take, for instance, the number of times that individuals retiring from an organization are asked to spend their remaining two weeks of employment documenting their knowledge in the form of Standard Operating Procedures, or helpful day-to-day procedural processes employed by the retiring personnel. Most often, the wheel requires reinvention.
5. And lastly, personnel are engaged in a culture that actually discourages knowledge sharing because knowing details about a certain job is equated to corporate job security

(Davison & Voss, 2002, p. 12).

In the examples above, it is obvious to see how and why a knowledge management initiative would benefit an organization even at an elementary level. In reviewing the five examples, decision making is significantly influenced by the types of information made available and the time required to assess and/or obtain that information. Why not through an enterprise-wide document and content management system developed and maintained by the corporate in-plant document services division? Consider a centralized enterprise-wide repository housing a bank of corporate data stored in the form of documents, spreadsheets, PDFs, images, reports, trend analyses; or related documents sent as e-mail attachments; or sales reports and sales forecasts; or video excerpts from meetings and presentations, audio clips from Webinars, or industry reports; managed by the in-plant print center (or document service center). Such a service would strengthen the bond of the once-eschewed in-plant print center to the organizational mission and enhance an enterprise-driven knowledge management initiative dedicated to capturing, archiving, and disseminating knowledge to those in the organization in need at the very time that they need it.

Socrates said that he was the wisest man alive because he knew one thing—that he knows nothing. Knowledge management humbly takes us to the realization that in order to be wise we must be cognizant of the fact that we know nothing. In this paradigmatic dimension where knowledge workers emerge to sustain existence of the organization, it is imperative that we attempt to know what we do not know and identify what we do know. We must start with the knowledge that we already have, beginning with documents and content. The in-plant print center is a primary area in which to lead the movement and assist with design and implementation of a knowledge management initiative. This is where explicit knowledge is made tangible and delivered en masse to those designated to receive it. One of the comments posted by a participant in the survey pertaining to the initiation of a document/content management/content program within their organization read, “I’ve got enough to do, thank-you.” This statement, although well taken, represents a majority camp in a challenged discipline and strikes a

measurement that shows the huge delta between those print centers that are innovative, futuristic, and clearly in tune with their organization's mission—and those that are still attached to traditional ways of thinking. In Drucker's (2001) post-capitalist society, success comes from that knowledge that is generated collaboratively with a vision. Success comes from the knowledge worker. In-plant print centers are comprised of highly specialized knowledge workers that process the explicit knowledge created within their organizations. They must, then, unite with the parent organization and be initiators of knowledge capture, knowledge archival, and knowledge dissemination in order to uphold the vision and emerge as the purveyors of values and excellence.

Glossary of Terms

The following terms assist in the understanding of the lexicon used throughout this report:

In-plant Printery (a.k.a. In-plant Print Center)

An in-plant printery is a centralized dedicated cost center facility within a host organization staffed by employees whose primary mission is to provide services for reproducing and disseminating printed collateral using different traditional and digital technologies. Some in-plant print facilities provide electronic graphic design and web development services, as well as, mailing and distribution functions (Vines, 2004).

Document Management (DM)

A term used to describe a system for managing both paper documents and electronic files. Files that exist in hard-copy can be scanned and made into electronic files, tagged, categorized and made accessible to a parent organization.

Content Management (CM)

A term used to express a form of knowledge management software and practice for tagging and categorizing metadata. The software assists in finding accurate data within a knowledge body through electronic search protocol and “links the content to business rules, applications and other bodies of content, to provide customized intelligent usage of the content in an automated and dynamic fashion” (Frappaolo, 2006, p. 89).

Electronic Document Management Systems (EDMS)

Generally, Electronic Document Management Systems (EDMS) are comprised of robust software applications that focus upon databases. The databases are built around indexed electronic documents and/or files containing valuable content that can be searched, retrieved, monitored, tracked, and repurposed by any designated entity within a parent organization.

Knowledge Management (KM)

A business concept centered around the simple premise that an organization is only as good as the collective knowledge it can capture and leverage to give it a competitive advantage. It is, in effect, “the leveraging of collective wisdom to increase responsiveness and innovation” (Frappaolo, 2006, p. 8).

Resources for Knowledge Management

In addition to the many works cited in the References section of this paper, below are additional on-line venues for acquiring practical advice for beginning a knowledge management initiative, or, obtaining beginning, intermediate, or advanced document management systems (source: Frappaolo, 2006).

Association of Knowledge
(<http://www.kwork.org>)

Delphi Group
(<http://www.delphigroup.com>)

Destination KM
(<http://www.destinationKM.com>)

The eKnowledge Center
(<http://www.eknowledgecenter.com>)

Intelligent Enterprise Magazine
(<http://www.intelligententerprise.com>)

KMCi--Knowledge Management Consortium International
(<http://www.kmci.org>)

KMPro
(<http://www.kmpro.org>)

Knowledge Management Resource Center
(<http://www.kmnews.com>)

Knowledge Nurture
(<http://www.knowledge-nurture.com>)

Knowledge Shop
(<http://www.knowledgeshop.com>)

Mywiseowl.com
(http://mywiseowl.com/articles/knowledge_management)

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About EDSF (The Electronic Document Systems Foundation)

EDSF, a charitable 501 (c)(3) organization, helps build the next generation of digital professionals through scholarships while conducting unbiased research on trends, methods, and changing technology of the digital content and document industries and the impact change has on customers. EDSF supports the industry's future by granting scholarships to students in support of their academic careers, by providing research grants to colleges and universities, by building an awareness about industry careers, by providing the EDSF Report, and by recognizing innovative educators and educational programs. EDSF serves vendors and users who design and implement document solutions for business applications.

For more information about EDSF, call +1-310-265 5510, write info@edsf.org, or visit the EDSF website at www.edsf.org.

About The California Polytechnic State University (Cal Poly)

Cal Poly is a nationally ranked, four-year, comprehensive public university located in San Luis Obispo California. The emphasis of the University is a "learn by doing" educational experience for its more than 18,000+ students. Many students seek admission to Cal Poly not only because of its excellent academic reputation, but also because the 6,000-acre main campus is nestled in the foothills of San Luis Obispo, just minutes from California's Central Coast beaches.

About the Graphic Communication Department (GrC)

Cal Poly's Graphic Communication Department (www.grc.calpoly.edu) is celebrating its 60th anniversary in 2006. It is one of the largest and best-known programs of its kind in the nation with more than 33,000 square feet of modern laboratories and over 3,000 alumni. The department offers concentrations in printing and imaging management, electronic publishing and imaging, design reproduction technology, graphics for packaging, and an individualized course of study. In cooperation with Cal Poly's Orfalea College of Business, the department also offers an MBA with a focus on document systems management. The department is accredited by the Accreditation Council of Collegiate Graphic Communications and houses the Graphic Communication Institute (www.grci.calpoly.edu). The Institute conducts research, testing, product evaluations, seminars, workshops and conferences for industry. As part of its 60th anniversary year, the department has launched a \$2.5- million development program to ensure that it continues serving the industry through highly qualified graduates.

About the Research Team

Ken Macro

Ken Macro is an assistant professor in the Graphic Communication department at the California Polytechnic State University in San Luis Obispo, California. Specializing in marketing, sales, print production management, knowledge management, and workforce training, Macro also assumes the responsibilities of faculty advisor for University Graphic Systems (UGS)—a student-managed, student-run, fully-functioning printing company. Macro began teaching as a part-time lecturer in 2001. He began his full-time tenure-track career within the department in 2002.

Macro's employment experience includes: director of reprographics, mailing, and shipping services at the California Polytechnic State University in San Luis Obispo, California (2000-2003); director of printing and copying services at the University of Akron in Akron, Ohio (1996-2000); ad

production manager at Alltel Publishing Corporation in Hudson, Ohio (1993-1996); marketing director for Community Rehabilitation Services in Pittsburgh, Pennsylvania (1992-1993); account executive for an independent Apple Computer reselling agency in State College, Pennsylvania (1990-1992); owner and president of Copy Break, Inc., a small copying and printing business in DuBois, Pennsylvania (1987-1991) and; regional sales coordinator for Kinko's of Ohio in Kent, Ohio (1985-1987). Ken holds a BA from the Pennsylvania State University and an MA from the University of Akron. He is currently pursuing doctoral studies in education from Walden University in Minneapolis, Minnesota. He resides in Atascadero, California with his wife and three sons.

Johnson Chan

Johnson Chan is a 2006 graduate from the Graphic Communication department at the California Polytechnic State University. He is currently employed as a prepress technician at Alonzo Printing in Hayward, California.

Emily Palmer

Emily Palmer is a 2006 graduate from the Graphic Communication department at the California Polytechnic State University. She is currently employed as an assistant production manager at American Litho in Sacramento, California (a Consolidated Graphics Company).

Laura Hobson

Laura is a sophomore at the California Polytechnic State University majoring in graphic communication with an emphasis in design reproduction technology. Laura designed the graphs for this report.

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