



Leveraging Technology to Streamline Intranet Strategies

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1.0 Introduction and Background

Most organisations are striving to reduce the cost of doing business to deal with the pressure of a highly competitive, global marketplace. In this context Intranets have emerged to be an essential tool for increased profitability, improved workforce morale and improved customer relationship.

“An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the Wide Area Network. Typically, an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences. An intranet uses TCP/IP, HTTP, and other Internet protocols and in general looks like a private version of the Internet. With tunneling, companies can send private messages through the public network, using the public network with special encryption/decryption and other security safeguards to connect one part of their intranet to another. Typically, larger enterprises allow users within their intranet to access the public Internet through firewall servers that have the ability to screen messages in both directions so that company security is maintained. When part of an intranet is made accessible to customers, partners, suppliers, or others outside the company, that part becomes part of an extranet.”

Source: searchWebManagement.com

The traditional view of Intranets is to realise savings from decreased cost of producing, accessing and distributing information within an enterprise. Publicly reported analysis estimates that 18% of organisational printed material become outdated within 30 days. Documents that are printed and mailed, such as internal phone books, policy and training manuals, requisition forms and marketing materials, can be put on an intranet and updated for a fraction of the cost of reprinting material. It is not only the publishing but the updating of information that leads to savings.

Pervasive high quality access via the Internet also enables Intranets to rapidly and economically deploy organisational information resources to a dispersed group of employees. This is particularly significant as most organisations have a substantial portion of teleworkers and e-lancers¹ in their workforce.

In recent years, a lot of new technologies have become available. However business managers have struggled to justify continued investments into the Intranet to reflect the increasing knowledge intensity of all types of work in the organisation. This is because it is very difficult to relate the application of a certain technology into a given productivity benefit. This is made even more difficult since true knowledge worker productivity benefits are very difficult to measure as compared to plain savings from the reduced cost of printing

¹ Drawing on their research at MIT's Initiative on Inventing the Organisations of the 21st Century, Thomas Malone and Robert Laubacher postulate a world in which business is not controlled through a stable chain of management in a large, permanent company. Rather, it is carried out autonomously by independent contractors connected through personal computers and electronic networks. They label them as e-lancers; electronically connected freelancers: The Dawn of the E-Lance Economy, Harvard Business Review, October 1998.

and distributing materials. Productivity is not just a function of finding the right information and people quickly but the speed and effort with which these can be utilised for a tangible business benefit. In most organisations tangible business benefits² stem from “moments of truth” business transactions such as:

- Completing a customer service request.
- Translating a lead into a sale.
- Completing a business compliance transaction.
- Completing an internal transaction.
- Finding the co-worker with right skills first time, every time, to satisfy a customer inquiry in real time.
- Collaborate with co-workers in the shortest possible time to achieve a customer or supplier outcome.

Essentially it is all about “output per person attributable to the introduction of the intranet”, expressed as a percentage. In our previous examples the actual effect of higher productivity, such as increases in sales, faster introduction of a new product to market or prescribing a cheaper drug is much larger.

Given such diversity in measuring productivity from an Intranet, it is very difficult to then assess which technologies are more urgent and critical to an Intranet from the hundreds available in the market.

This paper discusses the subject of incorporating a closed loop personalised user experience in the Intranet and implementing formal content management. It introduces the use of taxonomies as the bedrock of sustainable Intranet design. It then examines types of personalisation available and discusses their suitability for different Intranet audiences. It continues by exploring content management in detail. It closes with a call to action for those considering setting up or enhancing their Intranets.

2.0 Intranets and Taxonomies

Let us consider an abstraction of the facilities offered by an Intranet and a means to classify them. Maintaining a productivity gain focus introduced earlier, here is a recommended classification of Intranet facilities.

1. Publishing: using the intranet to deliver news and other information in the form of directories and web documents.
2. Transactions: using the intranet as a front-end to organisation-specific systems, such as Human Resources, Customer Relationship, Supply Chain, Enterprise Resource Planning (ERP) and other Core Applications.
3. E-mail and Scheduling Integration: implementing an e-mail system that integrates seamlessly with the intranet, allowing information to be both “pushed” and “pulled” and prevent the “attachment” culture.
4. Training: using the intranet to deliver online training at the desktop.

² This is something that can be reflected in dollar terms in a business case and survives peer scrutiny. It may still not be good enough for accounting purposes at all times.

5. Knowledge Management: using the intranet enables knowledge management by provisioning collaboration and shared workspace facilities to foster communities of practice.

Most Intranets demonstrate a good implementation of (1) above. Increasingly one can see quite a few Intranets offering facilities for (2), particularly in the area of Human Resources (leave management) and Internal Accounting (travel and expense management). Of late, one comes across some instances of (3)³.

Unfortunately, generally speaking, organisations continue to deploy applications in Customer Relationship, Supply Chain, Enterprise Resources and Core Applications via proprietary interfaces as Intranet and Enterprise Applications strategy and applications tend to reside in different areas of organisation governance.

Intranets demonstrating (4) and (5) are in early adoption stages at this time.

It is also important to understand that in a modern organisation the same individual plays different roles that require them to carry out different business transactions (content)⁴ that need support from a combination of the five types of Intranet facilities.

There are two critical aspects of an Intranet in adding incremental value to any enterprise activity or task:

- Its ability to consistently reduce the time it takes for a user to complete a business transaction.
- Its ability to proactively offer business transactions as candidates for usage.

Both require a sound basis of taxonomy and help from two technologies; personalisation and content management.

Taxonomy (also referred to as ontology) is the science of classification. In the business of Intranets, it is about separating elements of a group of content into subgroups. Taxonomies are often discussed in terms of it being external and internal.

The external taxonomy concentrates on content navigation principles, while the internal taxonomy concentrates on the orderly classification of business objects according to their presumed natural relationships.

An enterprise taxonomy classifies the different business objects into a category tree. Each category has the attributes (or metadata) associated with them. It goes without saying that an enterprise taxonomy must exist and form the basis of the Intranet content. A complete discussion of taxonomies, their development and implementation is out of scope of this paper.

³ A good test of this facility is whether 90% of email attachments are substituted by Intranet or Internet or Extranet links after the implementation.

⁴ We use the phrase “business transaction (content)” in a holistic sense to refer to activities ranging from finding a “passive” document to consummating an “active” financial or other enterprise transaction. The phrase’s “content” and “business transaction” will be used interchangeably in this paper.

However the following general principles provide the context for the technology discussion later on.

- The enterprise taxonomy should be open and flexible, providing a category for every type of content that must be managed.
- The types of Intranet facilities i.e. What business transactions it will support should drive the development of the taxonomy. In other words, developing a taxonomy in vacuum is very difficult, the Intranet business transaction scope constructively contains the taxonomy at a given point in time.
- For a given business transaction, the taxonomy will be the same regardless of whether it is accessed from the intranet, internet and extranet.
- The enterprise taxonomy must address the full life-cycle of the content not just creation i.e. modification, updating, expiration, archiving and deletion.
- All the potential sources of content should be identified, including content that may never be displayed or directly accessed on the Intranet.
- The attributes placed on the content (meta data) are the main driver for targeting specific content to a certain type of user role, it is the source for the personalisation of an Intranet solution.⁵
- Content should be broken down until it ceases to make sense. For example, an on-line book can be broken down in the following manner, book, chapters, topics within a chapter, pages and paragraphs. The content should be broken down to the lowest level where it can be managed, controlled and delivered, in the book example this may be topics within a chapter, but not paragraphs or sentences.

To close out discussion on taxonomy, a taxonomy is not a site map or a navigation guide for the Intranet. Indeed a taxonomy is not intended for users of the Intranet, only for intranet content authors, creators, custodians, and administrators. However for an Intranet, potentially every worker is at least an author and of course one needs to understand the underlying taxonomy when performing an attribute (meta data) search for content on the Intranet. A well developed taxonomy for the content that an Intranet will deal in, is the foundation of separating the presentation and function (or body) of content.

⁵ This is regardless of the algorithm used to personalise i.e. rules, collaborative filtering, learning agents et al.

3.0 Personalisation and Content Management

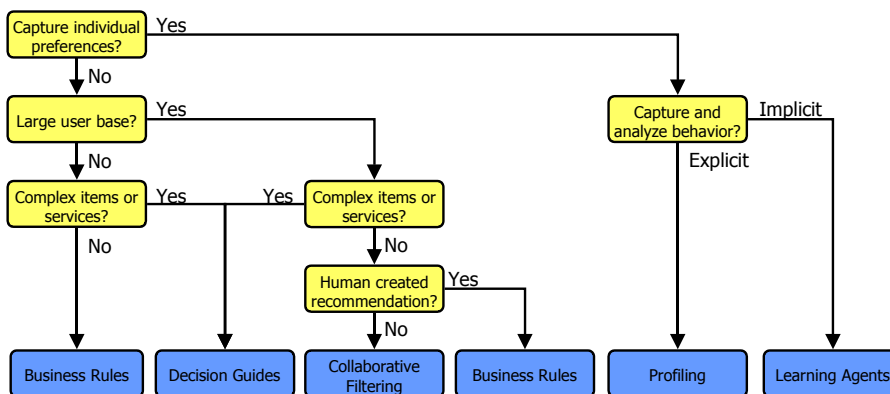
3.1 Personalisation

Personalisation simply is the act of presenting content⁶ that is suitable for the purpose at the time. It is not so much concerned with the user interface as it is with the content itself. An Intranet that provides personalised content will probably also offer personalised user interface.

Personalisation potentially has huge payoffs, successfully done it can dramatically reduce the time to complete a business transaction using the Intranet. It becomes disproportionately more important as the volume and diversity of content available on the Intranet increase. Further it starts to become an essential characteristic of an Intranet in “Knowledge Intensive Organisations” where people do not just have one job, instead they are encouraged to play different roles aided by knowledge both tacit and explicit. The potential downside of personalisation is that too much done too soon can have an equal negative effect in developing “role based tunnel views” of the organisation.

From a technology perspective, the personalisation technology segment is quite young and indeed some of the early hype is slowing settling in.

The following schematic offers a simple framework to understand and plan personalisation for Intranets.⁷



Business Rules and Decision Guides

Business rules and decision trees are quite simple technologies. Essentially all content is associated with a business rule, that is recorded using special software and referenced during Intranet delivery. The content selected for delivery is chosen based on the business rule associated with the user, either individually or the role being used. This association is of static nature i.e. Established at log in time or indicated explicitly, rather than determined by

⁶ Content means unstructured information as well as structured application transactions as always.

⁷ Nothing Intranet specific, this framework is equally application to Internet, Extranet and indeed Phone based service delivery !

the Intranet in real time. Decision guides are utilised when the rules are complex (essentially uses the good old high school decision tree logic), business rules on the other hand tend to be single dimensional.

The upside of these two techniques are that they are relatively simple to conceive and design. Their downside is that they have been typically implemented using “custom programming” and are expensive maintain. Most current personalisation packages will establish a “well formed relationship” between the software that delivers the Intranet and itself so that each can be independently maintained.

Collaborative filtering allows an Intranet to respond to a user, based on a history of interaction of other users “like this user”; hence the reference to collaboration. The technology often uses sophisticated algorithms or equations combined with sophisticated historical usage analysis of the user and others “like this user”. This technology has developed from the e-commerce domain of applications and a notable large scale user is amazon.com.⁸ Almost without exception, special software will be required to implement collaborative filtering. The acquisition and implementation of this software are a nontrivial exercise.

Profiling is quite similar to collaborative filtering except that it tends to work off the specific users individual preferences (which of course can be the role the user is playing at the time). Group comparisons in real time are not usually done. Further the capture of the preferences can be implicit or explicit, when it is explicit it is profiling. This is more suited to Intranets, as by definition it is easy to get the profile explicitly. The implementation can be quite simple if explicit profiling based on user roles is carried out.⁹ Once again it is a good idea to have a “well formed relationship” between the software that delivers the Intranet and the “profiling technology”. Increasingly web application servers are providing for some form of profiling and hence special software does not need to be acquired.

Learning agents take us into the territory of implicit capture of user preferences and behaviour in real time and serving content in response to that in real time. It is very powerful as it is based on actual observed behaviour of the user. It is quite resource intensive (computational resource). This technology would often utilise neural networks. The biggest possible payback of this technology is in creating an understanding of how the same roles are being played by different individuals, differently. The technologies involved here are in the early adopter stage. A prerequisite to using learning agents is an extremely mature taxonomy of business processes and roles within the scope of the content being delivered.

The important thing to consider, is that one is likely to use more than one of these techniques as the Intranet matures. It is our opinion that most New Zealand Intranets today are ready to derive substantial benefits from implementing “Business Rules” and “Decision Trees”. Collaborative Filtering is a very powerful technology, however quite complex to implement and maintain and only yields good results with user populations of 1000’s and where Intranet has been established as the “Desktop”.

It should be noted that there is very little standardisation of the representation of rules, decision trees, algorithms, metrics in the industry right now - thus the task of switching personalisation products and technologies is a substantial venture. The worst case scenario,

⁸ Good next level detail at <http://pespmc1.vub.ac.be/COLLFILT.html>

⁹ An organisation may have 1000 employees, but only a 100 roles.

as mentioned above, is when personalisation is embedded in the program objects that make up the Intranet e.g. ASP scripts, Javascripts, HTML scripts et al. This is so because changing or removing personalisation would mean potentially re-architecting or redeveloping parts of the Intranet.

In our opinion the real issue is not which technology to use for personalisation but ensuring that the personalisation loop is closed. This simply means the following:

- If personalisation is implemented then the appropriate “meters” need to be embedded in the Intranet that “measure” the effectiveness of content delivery by the users.
- A regular and exception reporting mechanism exists to look at the “metrics” as collected by meters embedded in the Intranet.
- Processes are in place that close the loop of changing/adjusting/retiring the personalisation mechanism based on the “metrics”.

The essence is to eliminate the “guesswork” involved in the Intranet enhancement decision making process. So in deciding to implement personalisation for the Intranet, the chosen products should be capable of supporting the types of personalisation required and enable the implementation of a closed loop regime.

To close the discussion on personalisation, the reader may like to examine the following products to form an opinion about the state of commercial product offering in the market, listed in strict alphabetical order.

- Autonomy
- Blue Martini
- IBM Websphere Personalisation Server (bundles Macromedia LikeMinds)
- Macromedia LikeMinds
- Microsoft Content Management Server
- NetPerceptions
- Vignette

Between them, all types of personalisation is covered and more !

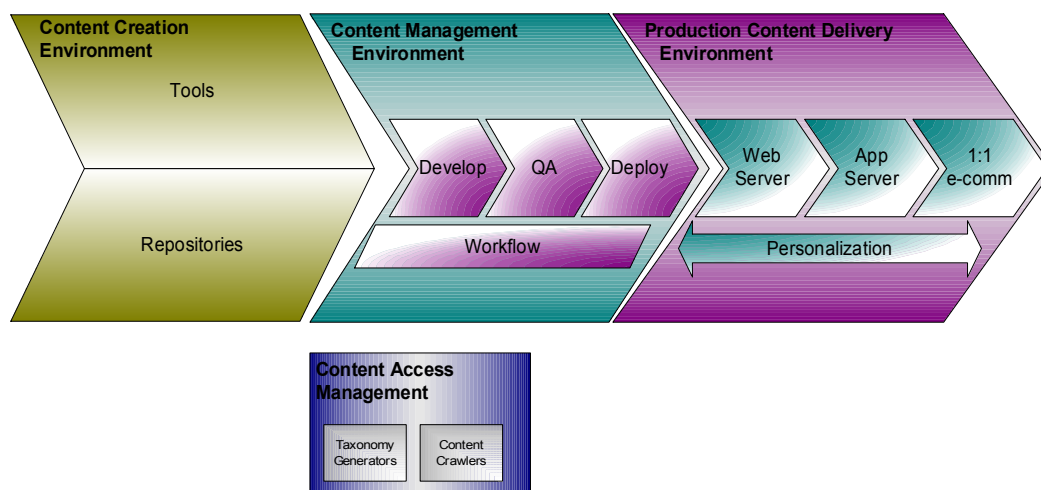
3.3 Content Management

Content Management (CM) is often equated with a repository based facility to store web content with some metadata management. A cursory examination of the leading practice reveals that it is much more. It is clearly well beyond a document management tool with a web client. Most commercial Content Management systems propose that we manage a Web site (intranet, extranet, or Internet site) and all its contents through it. This leads on to an examination of facilities that CM systems (CMS) provide.

In our context, Content Management is the business of separating the form from the function for all web content. This view leads us to the following main classes of functionality for intranet content management.

- Functionality enabling the management of Intranet structure. The ability of the tool to help design and maintain the structure; content, web page and links.
- The different ways in which the tool allows input of content. Intranets thrive on maximum participation of the users¹⁰. So it is quite important that the CM tool does not create a barrier to participation.
- Syndication capabilities; modern intranets invariably present external content¹¹. Hence tools seek to offer facilities to process external content.
- Publication process support is the core facility that a CMS provides. Even on an Intranet it is essential that all content follows a single set of processes to make it to the page. CMS's face a particular challenge here as by the very definition an Intranet must allow the coexistence of "trusted and official" content, as well as "community of practice discussions", latter a source of much tacit knowledge.
- The method of storing the content is quite an important feature. Ideally a CMS should store the content quite separate from its form. This enables the delivery of content to non-PC mobile devices such as PDA's like PalmPilot, without having to create special version of the content.

This leads us to the fundamental debate about whether a CMS should participate in Content Delivery. The author recommends the use of the following solution framework for the implementation of Content Management for Intranets.



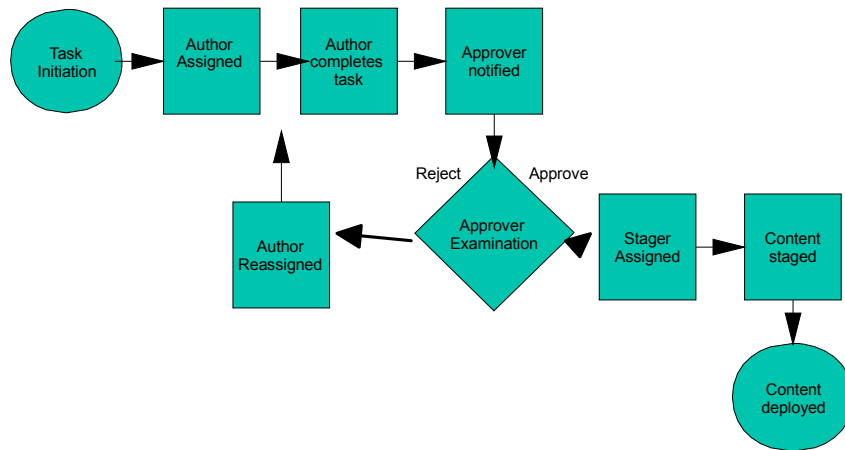
Source: Adapted from Interwoven, IBM and authors own experience.

¹⁰Several KM authorities have opined that a pervasive, high input intranet with very low barriers to input is a major tool to capture tacit knowledge.

¹¹At IBM one could manage their Equiserve Stock Account from the Intranet, as well as have news piped into the webtop, as well book a rental car using Hertz (which recognised one as an IBM employee !)

The author is of the opinion, that CMS provides a solution to the middle space i.e. Content Management Environment, steering clear of Content Creation and Content Delivery. CMS's may be involved in the Content Access Management; another "management" requirement.

By definition, Intranets have to reside within an organisation wide "tools and repository environment", as well as, clear "delivery" environment. Thus, by treating the "content management environment" as the boundary of CMS allows organisations the greatest freedom of tools and technologies along all three solution domains as depicted in the framework above. Regardless of the choices made, the molecule of Content Management is the atomic content workflow as depicted in the diagram below:



It should be noted that application of the above for transactional content is a nontrivial activity and readers are recommended to make appropriate allowances when planning their Intranets.

3.4 Choosing a CMS and the NZ product landscape in April 2002

The CMS market is quite mature in New Zealand driven by early adoption from major organisations in the Media (INL and NZOOM), primary (Fencepost), Telecommunications (Telecom) and others. The last 12 months has seen quite a range of products being offered and supported in the market. The following table provides a snapshot as of April 2002.¹²

Company	Product	Customers	Price Range
e-cision.com	Webnovo	Hitachi Data Systems	\$30,000 plus
Rex.co.nz	RexComposer	Civil Aviation Authority	\$15,000 onwards
MasonHQ.com	Mason	Salon.com, Ducati.com	Free product
Viatx.com	ViatxContent	Do not know	Do not know
Interwoven.com	Teamsite, Vignette	A large utility company and Fencepost.com	\$200,000 plus
Straker	Shado	Southern Cross Healthcare	\$20,000 plus
Microsoft.com	Content Manager Server 2001, (acquisition of NCompass)	Do not know	\$50,000 plus
Documentum.com	4i		\$200,000 plus
Vignette.com	V/5 and V/6 Content Suite	nzoom.com, stuff.co.nz	\$200,000 plus
Presence Online(aprix.com)	Aprix Multiplatform	Liquid.co.nz	\$100,000 plus
Interventures.co.nz	AssetNow	David Shaw Furniture	\$995 plus

¹²Hype: In 2002 every Document Management vendor will claim Content Management, DOC.1, the weekly e-newsletter of the AIIM (www.aiim.org) has reported at least one CM and DM "deal" every week since Dec 2001 and it continues.

The choice of a CMS is probably the most significant decision of an organisation in the Information Management function. The key is to drive it by “needs” and not “wants”, making the right investment in taxonomy and being in a position where the content does not get locked into a proprietary format specific to the tool.¹³ Most importantly, care should be taken to do it right by the organisation and not be swayed by individual project requirements.

3.5 Critical success factors for a high quality content management system (CMS)

The author has been privileged to guide the specification, selection and implementation of content management systems in New Zealand as well as being a user of two quite diverse implementations as a user. From this experience it is the author’s view that the critical success factors for the implementation of a high quality CMS are as follows:

- Training in the chosen CMS, very simple, obvious but without exception rarely budgeted for in time or dollars in the projects.
- Appointment of the Content Management “human roles” early and having them lead the CM implementation.
- Developing the taxonomy, implementing the taxonomy and institutionalising the taxonomy.
- Repurposing or conversion of existing content into a state that separates form and matter and assignment of meta-tags. (taxonomy again).
- Ability to resolve the political nature of content in how it is created and managed within an organisation to getting it under the management of the CMS.
- Implementing one CMS to serve all nets; the intranet, extranet and the Internet presence.
- Making it easy to create content - everyone in an organisation is not an author, however a good Intranet needs to make an “accidental author” out of everyone.
- A well thought out, well formed architecture to integrate the CMS with the business application delivery systems i.e. Does the CMS fight or love the Intranet (Web) Serving Infrastructure that is not-negotiable.
- Implement CM for an initial “project” of between 6-9 month's duration initially.

¹³The typical rhetoric is “we store it in XML”, actually XML is not a format, it is language to create formats; we wonder why we do not have an XML to represent a word processor document if it was as simple as applying a format. Finally what happens to the interface between the CM systems and transactional systems ?

6.0 Call to action

A good test of successful deployment of the technologies discussed in this paper are quite simple. Here are some questions to get started:

- What is progressive reduction on number and volume of Internal content being transported using email attachments since the introduction of the Intranet ?
- What percentage of employees are habitually producing content for the Intranet ?
- What percentage of business critical content will only be found on “C:” drives or “private accounts on LAN Drives” as compared to on the Intranet ?
- What is the level of confidence of the content on the Intranet i.e. Do employees habitually use the Intranet content to make representations to each other, customers and suppliers without having to manually (thorough a conversation or email) check its veracity ?
- Has there been any substantial change in “business transaction throughput” for business transactions available through the Intranet ?
- Can all employees initiate a content submission through their standard desktop tools i.e. without needing to use specialised publishing software ?
- Can one navigate 100% of the content on the Intranet using a “Taxonomy Tree” ?
- Is there an agreed, versioned enterprise taxonomy available and understood by majority of the employees ?
- Does the Intranet recognise the role the user is playing and responds accordingly ?
- Does the Intranet enable an automated assignment/revocation of roles to employees without resort to email and paper ?
- For those content items that is not enterprise confidential, does only one versioned copy exist being accessible from the Intranet, Internet and Extranet e.g. Product/Service Brochure or Official Policy for a public service ?
- Are the vast majority of the discussions between employees as well as employees and customers held on the Intranet and automatically harvested in a form that they can be easily used for strategy formulation, decision making and dispute resolution or are we still dealing with the “I do know who has that in which e-mailbox” syndrome ?¹⁴

The above is by no means an exhaustive list of questions, they are intended to get the reader thinking in terms of leveraging technologies such as Content Management and personalisation for Intranets.

¹⁴All references to employees mean the workforce i.e. include sub-contractors and e-lancers.

7.0 Conclusion

In most organisations Intranets have evolved organically rather than following a disciplined approach. This paper argued that Intranets are not trivial assets and indeed have a far greater impact on productivity, efficiency and profitability than perhaps any other information system asset. It examined the roles of personalisation and content management technologies in this context and presented the critical success factors and an environment scan for content management systems in New Zealand as of April 2002.

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The author acknowledges the following sources that have shaped many thoughts, provided clarity and inspired this paper.

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7. Information provided by New Zealand companies; Rex, Viatx, Straker and e-Cision
8. Intranet experiences at many NZ government departments and corporations while working on projects with them.