

GHSP Employee: **Geoffry A. Twietmeyer**
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EVALUATING A NEW KNOWLEDGE MANAGEMENT TOOL

Geoffry A. Twietmeyer, Western Michigan University
David M. Lyth, Western Michigan University
Larry A. Mallak, Western Michigan University
Betsy M. Aller, Western Michigan University

Abstract

Common solutions for knowledge management generally depend on databases or text base searches. This paper presents a new approach to knowledge management--treemaps. This approach allows employees to search for expertise in specific areas and give them multiple employees to contact for that knowledge, ranked by a self-assessment of their knowledge. Additionally the same knowledge measurement tool provides managers and human resources an easy summary that allows them to view organizational knowledge gaps and training opportunities.

This paper explores the feasibility of using treemapping technology to create the first step in a knowledge management program. Treemaps are graphic visualizations of large sets of information with many hierarchical levels. Treemaps were created for the knowledge held by a leading supplier of mechanical and electro-mechanical systems to the automotive, transportation, and office furniture industries. The methods used to create the treemaps will be discussed, as will an evaluation of the treemaps by their users.

Key Words

Culture, measurement, application, knowledge map

Company Background

The company analyzed in this paper was founded in 1924 and has grown into one of North

America's leading designers and manufacturer of mechanical and electro-mechanical systems. The privately owned firm currently supplies the automotive, transportation and furniture industries, with the bulk of its sales in the automotive industry. Currently, the company's largest customers are Chrysler, General Motors, Ford, Honda and Nissan, comprising 93% of the annual sales.

Diversification of customers, products and locations presents a challenge to the firm in terms of managing the knowledge of its technical employees around the world.

The company currently operates facilities in four countries and employs over 800 people. The company has a global manufacturing presence with manufacturing operations in west and southeast Michigan, along with Shanghai, China. Along with the corporate headquarters in west Michigan, there are engineering and sales offices in Japan and China. These acquisitions and expansions have increased the number of locations where technical expertise is spread.

Introduction

Historically, knowledge measurement or intellectual capital measurement has been driven by the need for a company to add a financial value to the intangible assets of a company. In today's knowledge-based economy, the value of the knowledge portion of a company's intangible assets can be quite substantial, and have a large impact on a particular company's stock price. Since the company in question is privately owned,

the impact of the company's intellectual capital on stock price or market capitalization is irrelevant. What is relevant is how the company identifies, locates and exploits the knowledge that resides in the company to maximize its return on investment.

There is a common knowledge problem in every organization, and every employee has heard of it before. In short, the problem is, what happens to an employee's knowledge if he or she gets hit by a bus? This tacit knowledge about work performance is present in the heads of all employees, but if the knowledge remains there, it is apt to be lost if the employee is promoted, leaves the firm, gets hit by a bus or in some other way leaves the post. It is in the organization's best interest to capture that knowledge and make it formal or explicit knowledge (Erickson, Rothberg, & Wuerz, 2002).

The basic problem then becomes, how does an organization facilitate the measurement, both in amount and importance, and transfer of that knowledge? Once this knowledge has been located, measured and otherwise identified, then it can be transferred. Traditional methods include paper knowledge books such as Chrysler's Engineering Books of knowledge, and computer databases such as Hewlett Packard's Lotus database of "Trainers' Trading Post" (Davenport & Prusak, 2000).

Information transfer is richest through person-to-person contact and, with the establishment of the Technology Development Team, the company has taken a step in the right direction. This team is designed to lead the company in the development of new technology and mentor other engineers throughout the company. However, the seeker of knowledge still needs to know who on the technology team to see. Even more problematic is the measurement of that knowledge and giving management a tool to visualize weak points and needs for knowledge development in the organization.

Review of Literature

The idea that people are a valuable asset to organizations is not new. As early as the 17th century, Economist William Petty argued for the value of workers to be accounted for by actuaries in the calculation of wealth of a company (Carson et al., 2004).

The majority of research regarding knowledge management focuses on measuring knowledge for the purpose of establishing a monetary value that can be accounted for. Indeed, before the term knowledge management was used, there was research into intellectual capital measurement. The term intellectual capital is not accidental, and is meant to convey a similarity to other types of capital present in the business world. Intellectual capital can be broken into three categories: Human capital has to do with individual knowledge about how to do one's own job. Structural capital concerns knowledge about arranging the organization's resources to the best advantage and Relational capital refers to knowledge about relationships with outside collaborators (Erickson et al., 2002). Structural capital is conventionally used to refer to the processes and procedures that are in some way recorded and hence accessible to the organization. (Carson et al., 2004) There are a number of examples of structural capital in an engineering department, such as, engineering change procedures, engineering service (FEA, tolerance simulation) request procedures, to name a few. Additionally, relational capital abounds in an Applications Engineering Department, where technical people from the firm, its customers and suppliers, communicate on a daily basis.

In their book *Working Knowledge*, Davenport and Prusak (2000) outline a commonly accepted framework for defining knowledge that consists of data, information and knowledge. Data are discrete, objective facts, commonly found in organizations as structured records of transactions. Information is a message; unlike data, it contains a relevance and purpose. Finally, knowledge is defined as:

"...A fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories, but also in organizational routines, processes, practices and norms" (Davenport & Prusak, 2000).

Clearly, this definition restricts knowledge to something that must be possessed by people. Since we have now established that knowledge is

innately human, possessed only by people, and that there is value in that knowledge, we have opportunities and some challenges. The opportunity manifests itself in the fact the people are a manageable asset and are capable of continuous improvement and a seemingly never ending supply of ingenuity and innovation. This spirit of innovation and improvement is one of the underlying forces that can prompt people to share their knowledge. The challenges that are presented are those of managing people, primarily managing the cultural aspects of transferring knowledge between employees. Additionally, locating and developing a means of transfer that fits into the cultural aspect of the organization can be quite challenging.

Methodology

Impact of culture on knowledge management & transfer. The first hurdle to overcome in mapping knowledge is the cultural hurdle of knowledge hoarding. How do you encourage employees to acquiesce to have a map of what they know published within the organization, or more importantly having a map of what they do not know? The inherent vulnerability involved is exacerbated by the fact that much of the expansion within the company has been in low cost countries. How do you convince engineers in the US to document what they do not know under the specter of low cost replacements?

The most basic aspect of knowledge management is communication. Without communication no knowledge can be transferred, and without any transfer, there is nothing to manage. Indeed, knowledge management might more aptly be called knowledge transfer management. The underlying aim of any knowledge management program is to increase the overall knowledge of the organization. This cannot occur without transferring knowledge from one person to another, which is fraught with numerous problems.

One of the primary objectives of any knowledge management or knowledge transfer program is to prevent reinvention of the wheel and reduce redundancies of knowledge-based activities (Arora, 2002). Communication enables the transfer of knowledge throughout the organization, but there are significant cultural roadblocks,

especially in larger organizations. Larger organizations tend to be organized into profit centers, which can lead to knowledge silos, where the knowledge stays in the business unit and is not transferred to the large organization. This fosters several cultural barriers to knowledge transfer: people in one unit may not be ready or willing to part with obtained knowledge due to extensive unhealthy competition with other units' people in the units may be willing to share but do not have a disciplined process of collaboration; and individuals may see too much emphasis on individual performance and not team performance, thus hoarding knowledge for their own benefit (Arora, 2002).

One of the most powerful components of organization culture is the political forces inside an organization. Knowledge maps are no exception. Davenport and Prusak (2000) state, "If knowledge is generally important to the organization and those who have it are recognized and rewarded, then the knowledge map will be a picture of status and success as well as a knowledge locator." Clearly this applies to a hierarchical type map, where the top knowledge repository is clearly identified. By reducing the hierarchical nature of the map, it should be less subject to the political aspects of the organization.

The impact of an organization's culture should not be underestimated for any major organizational change, but especially one that creates the employee vulnerabilities that a knowledge map can. In a technical organization, an employee's worth to the company is very largely based on what they know, and how the employee can apply that knowledge to affect the company's ability to profit from this knowledge. Therefore, the single biggest asset that the employee has to continued employment and advancement is their knowledge and the ability to apply that knowledge in a way that makes the company money. Establishing a map that outlines who knows what and how to locate them puts the employee's biggest asset at risk of dilution, and thus less valuable to the individual employee. One of the best ways to mitigate this risk is to establish a team-oriented culture that rewards the sharing and transfer of knowledge before trying to adopt a mapping and measuring program for the organization knowledge.

The first factor in the organization culture that works in favor of implementing a knowledge management system is the rewards culture of the firm. Teamwork is stressed and the compensation system is structured to reinforce this. Every employee is paid their base salary and an annual bonus based on the company's return on investment or ROI.

The second factor that works in favor of the establishment of a knowledge management program is the history of innovation and value of knowledge. Innovation comes from knowledge and the application of that knowledge. The company has a strong history of innovation and is recognized by its customers as an innovation leader.

The third factor in the firm's acceptance of a knowledge management program is the layout of the engineering department. As outlined above, the engineering functions are broken into two departments. The Applications Engineering department is subdivided into application groups focused on a particular customer. Each application group is co-located with representatives from both process and customer quality engineering.

The other engineering department, the Technology Development Group, was formed to develop new technology and enable the transfer of the latest innovations between the application groups. The engineers in the Technology Development Group are listed as product leaders, experts in each product that the company produces and serve as the technical leads for the other engineers in the company.

Measurement target. A survey instrument was developed to capture the information required to develop the tree map. The survey is broken into three sections. The first section consists of general employee information and an education summary. Some of the general employee data included is basic identifying information, such as first and last name. Other information is included to allow development of the tree map hierarchy such as location, current position, and department. The education summary listed is not included in the tree map. This information was included to develop an idea of what kind of education was present among the employees, but

assigning scores to education level proved very problematic. Scoring and ranking the education level and degree requires too many variables. How would it be possible to rank a similar degree from one institution versus another? Additionally, why would that be more important to the firm than the skills developed through that education?

The second section of the survey is a summary of relevant experience for each employee. The categories include overall industry experience and relevant experience in each product category for the corporation. The rationale for including the experience section was twofold. First, the amount of experience provides a good overall knowledge summary. Common sense tells us that the most experienced employees would have the most knowledge in any particular area. The wide range of values in such a category provides a good variable to determine the size of a particular square in the map. Furthermore, including the experience variable provides a measure of quality control. By reviewing the experience numbers against the skill numbers, a quick check of the validity of the responses can be achieved. Employees with the highest level of experience, should, correspondingly have the highest reported skill levels.

The third section of the survey is a self-assessment of skills in the following categories: CAD/CAE software, Productivity Software, Product Knowledge, Electronics, Material Science, Language Skills and Competencies. Each category contains the relevant skills, whether a particular software, language or engineering competency. The skills are ranked on a five-point scale using the following descriptions: none, beginner, proficient, expert, and teacher/mentor. This ranking method allows for additional visualizations beyond the tree map.

The most important factor in the development of the survey was the simplicity. The respondents are all very busy doing things that directly add value to the firm's profitability. It is easy for an employee to see the impact of their work on the company's ROI, and this is a very strong cultural force within the organization. With that in mind, the simplicity of the survey instrument is paramount. The primary manifestation of the simplicity requirement is the limitation of the survey to primarily technical information. Non-

technical categories, with the exception of some productivity software, were left off the survey, even though part of the target audience was non-technical in focus. This presented some gaps in the survey results, but improved acceptance of the survey from the respondents.

Explanation of scoring mechanism.

Respondents were asked to assess their skills for each category based on a five-point scale. The skill categories were none, beginner, proficient, expert and teacher/mentor. The limited number of categories simplifies the self-assessment process, and the categories describe skill levels that each respondent should be able to easily identify with. Furthermore, a brief description of each skill level for a particular product was listed to the right of the ranking area. The limitation to five effective skill levels made listing relatively detailed explanations of the skill levels on the survey itself, feasible. Further breakdowns of the scoring categories would have required further explanation that might not have been possible on the survey itself. Adding an additional explanation page would have been feasible, but cumbersome for the respondents.

Each skill level was assigned a score for use in the knowledge map. The scores ranked from zero for a response of "none" to a four for a response of "teacher/mentor". Assigning numerical values to the scores allows for importation into the tree map. These scores then become the basis for the color shades of each square.

Transfer of survey results to the tree map.

Once the survey forms were all collected, the data from the paper form was entered into a database. This database allowed for collection of all the data on the form and selective reporting of the fields of interest. The selective reporting allowed for exporting the data of interest (Name, department, skill scores) while maintaining an electronic record of each survey. Once the data was entered modifying the export format or order was relatively simple.

The formatting requirements of the data file for the tree map, and the creation of some levels of the hierarchy, namely skills quartiles, required manipulation of the raw survey data in Microsoft Excel. Once the data was entered into Excel,

manipulated and formatted, a tab delimited data file was generated for importation into the tree map software.

Knowledge Map

Map selection and history. Commercially available tree map software is available from a number of sources on the web. Some of these sources work via a web interface; others are stand-alone programs. All of these versions are variations of the original concept developed by Dr. Ben Shneiderman at the University of Maryland Human Computer Interaction Lab (HCIL). (<http://www.cs.umd.edu/hcil/>).

Originally developed for viewing the space utilization of a computer hard drive, tree map software allows easy visualization of data in a tree in a space-constrained format.

Three factors led to the selection of Tree Map 4.1 from the University of Maryland's HCIL for this project. First, the software is available for use free of charge for academic purposes for 30 days. Second, the source code for the program is available. Luckily this adaptation did not require modifying the source code. However, that was not entirely clear until all of the data were collected. Finally, the software is easy to use. The software allows importation of basic tab delimited data and does not require integration into the Windows operating system, allowing for easy installation onto any computer.

Review of mapped results. The survey results were mapped using primarily a two level hierarchy. The two primary levels used for the map were location and department. Since all of the respondents were located at the company headquarters in west Michigan, the top level of the hierarchy has only one choice. The second level of the hierarchy is the respondent's department. There are five departments for respondents, Technology Transfer, Applications Engineering, Testing Lab, Technology Development, and North Operations.

The best results of the map seem to be combining experience, either industry or product specific, and one of the self assessed skill levels. Exhibit 1 shows a map of industry experience and A/T straight gate skill level. Since the vast majority of the company's product is straight gate

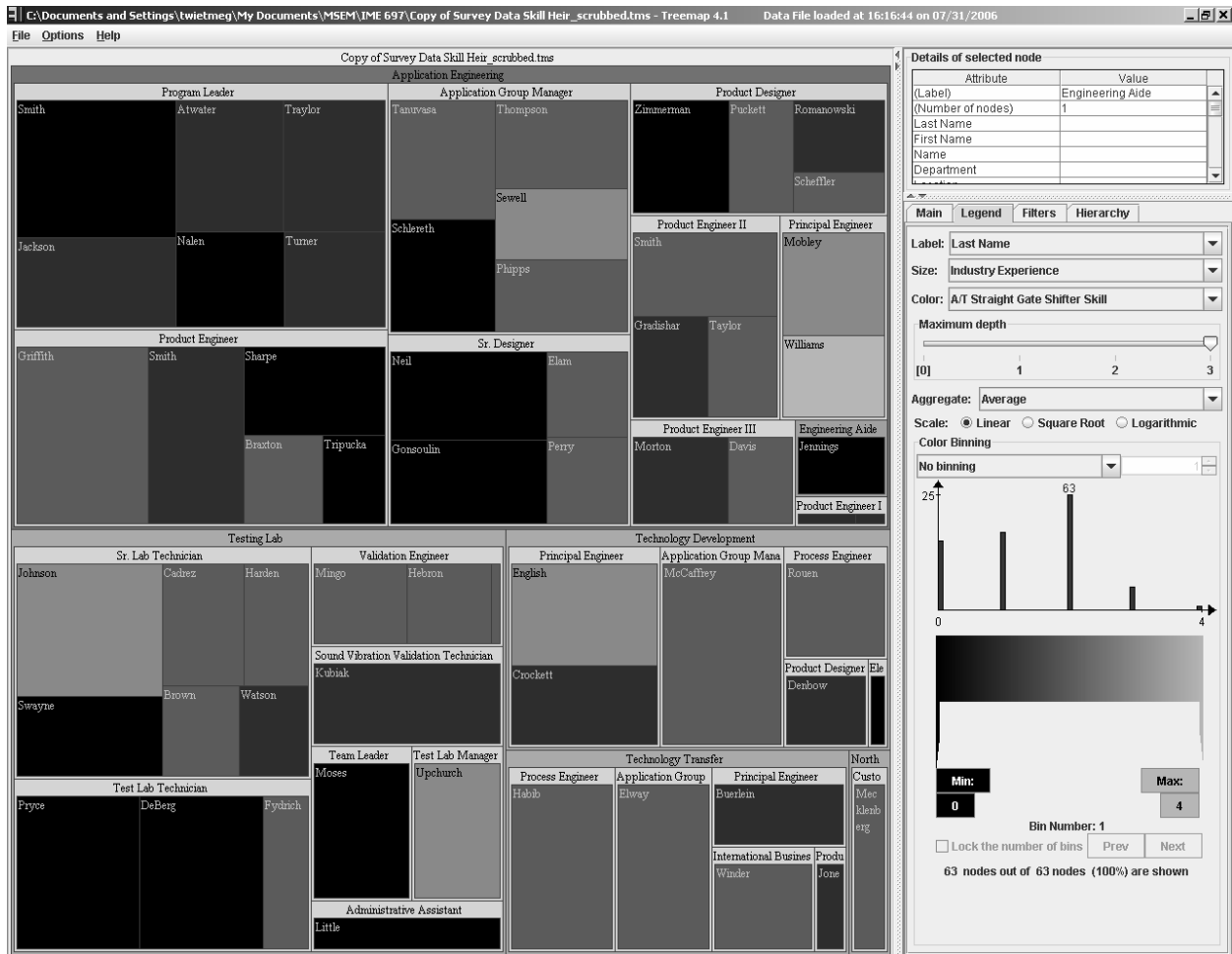
automatic shifter, it is the most logical skill assessment to use in evaluating the map. The size of each square is determined by the respondents stated industry experience and the color indicates the self-assessed skill level. The color label on the lower right portion of Exhibit 1 indicates how the skill level attribute is colored. On the map software the colors range from bright green for highest skill to black for lowest skill. On the grayscale maps included in this paper the lighter the color, the higher the skill level.

Locating the Principal Engineer grouping in the lower left corner of Exhibit 2, it is apparent that the

Principal Engineers do indeed have some of the largest and greenest squares. Furthermore, the upper left corner shows the Application Group Managers, with large experience, but not quite as much skill.

After reviewing the initial hierarchy an additional hierarchy criteria was added. By taking the individual self-assessment values for a category such as electronics and averaging those scores for a particular respondent we were able to develop quartiles for each category.

Exhibit 1



This manipulation was done in the Excel spreadsheet and manifests itself in hierarchy

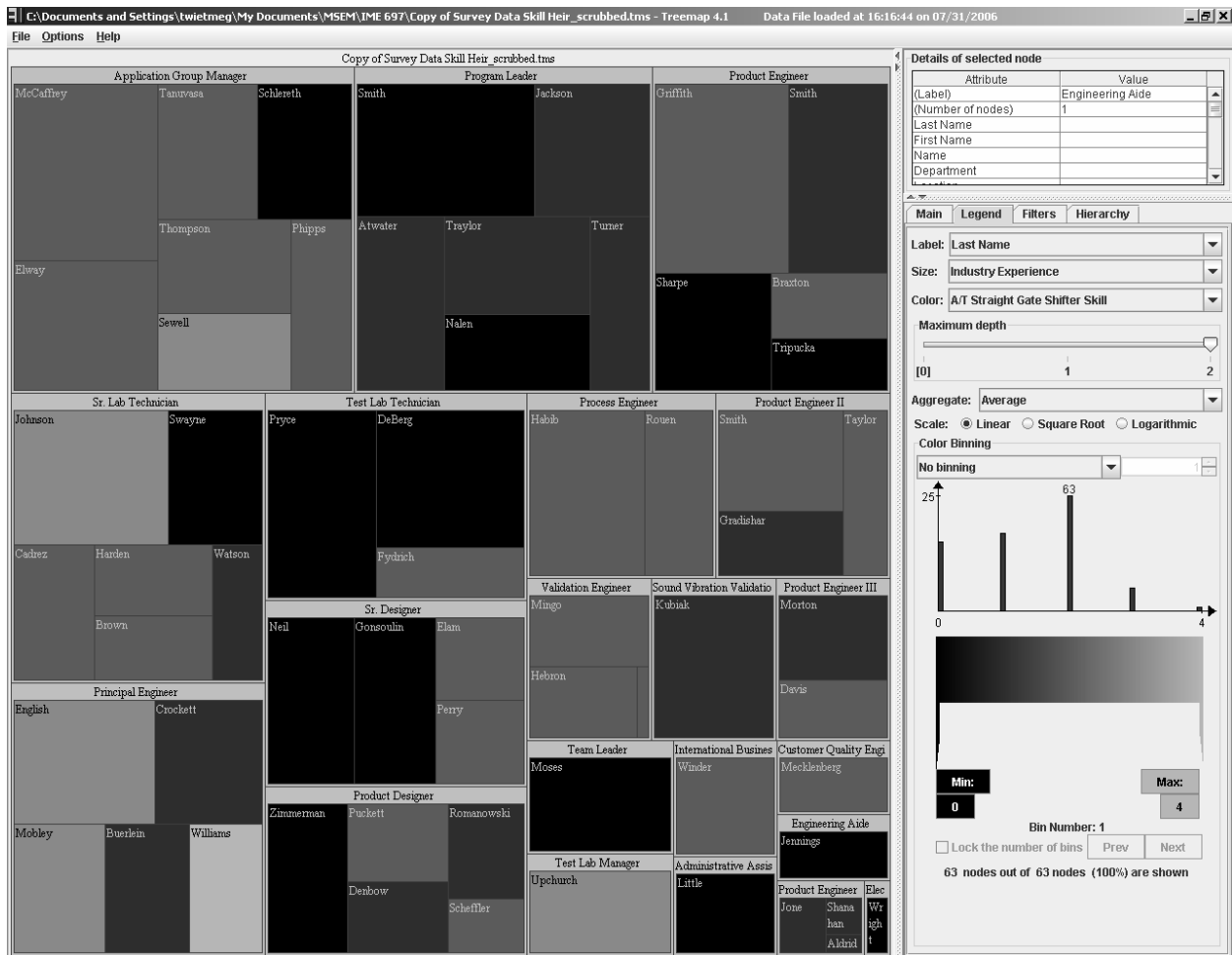
labels such as “CAD Skill – 1st Quartile”. This hierarchy allowed grouping of respondents with

similar skill levels in a category, allowing the user to see who populates a particular skill quartile by job description. Exhibit 3 shows all respondents arranged by job description and product skill quartile. Once again the square size is based on industry experience and the color is based on A/T straight gate shifter skill. This visualization allows the user to view multiple skill levels within the screen, although one of them is a composite

average. Visualization in this way would be particularly helpful in developing mentoring programs.

Using the additional hierarchy structure that ranks each respondent on the average score for a skill category provides additional insight into the organizations knowledge strengths.

Exhibit 2



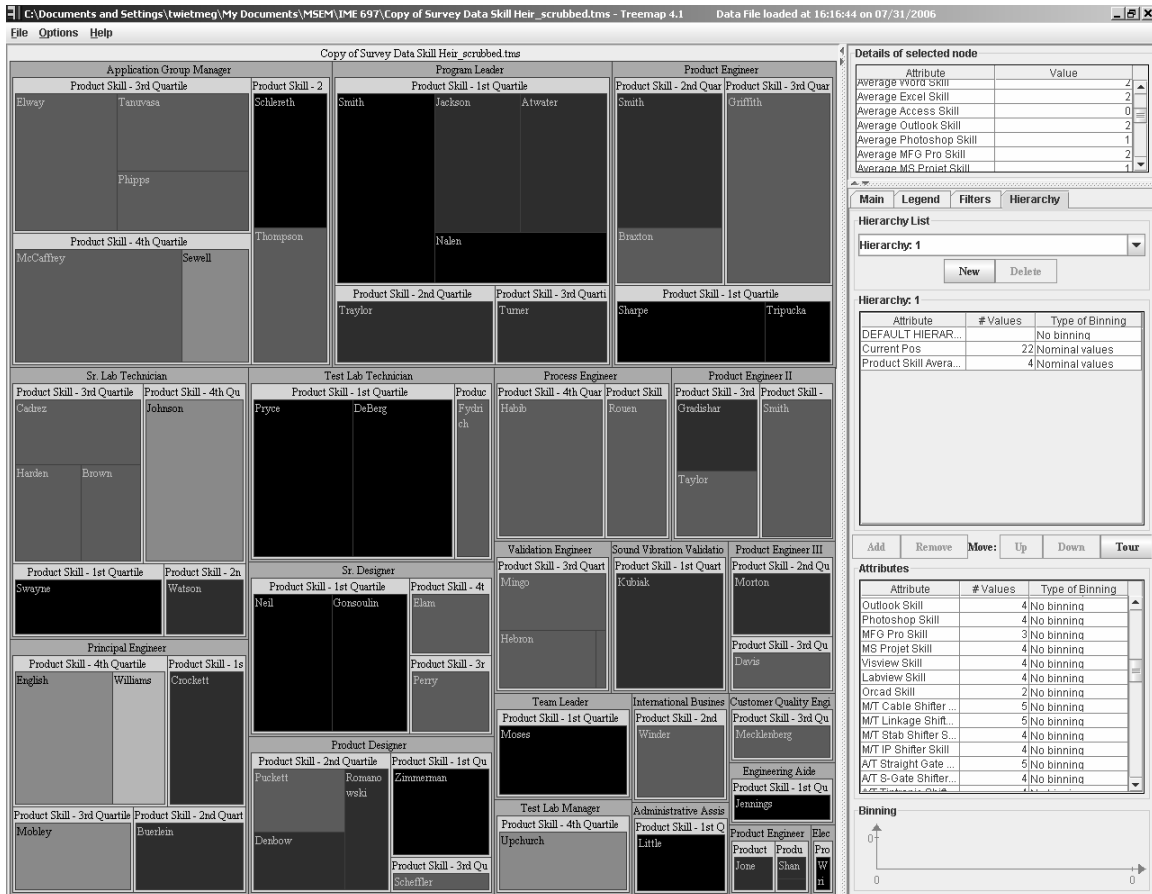
Identification of organizational knowledge strengths. A review of the results of the map shows that as expected, the organization has quite a bit of knowledge regarding A/T shift devices. If the legend values are set to A/T shifter experience and the user cycles through the

engineering materials, it is apparent that the organization is strong in the traditional materials, such as engineering plastics, ferrous metals and elastomers. Exhibit 3 shows the respondent's quartile ranking for CAD/CAE used in the legend instead of the hierarchy. Using this visualization it

is readily apparent the concentration of overall CAD skill is in the Product Designer and Product Engineer job descriptions. Changing the skill quartile one more time, to product skill shows a more even distribution of knowledge scores across job descriptions. This can be attributed to the varying products developed in each application group.

Identification of organizational knowledge weaknesses. Comparing the knowledge levels is not easily done with the map, since the scale is automatically adjusted to the highest score. By noting the maximum score and the relative color of the squares for any given combination, it is possible to notice weak areas of the organization's knowledge. Additionally, the number of respondents is an additional indicator of knowledge weaknesses. For example, Exhibit 4 shows the results for respondents with adjustable pedals experience and skill using CATIA CAD software. Reviewing these results shows that the organization is weak in people with adjustable pedals experience and CATIA skill level.

Exhibit 3



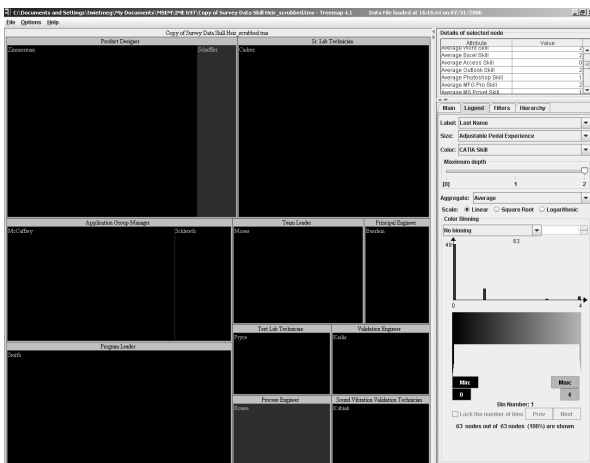
Using the map in this way provides a strong planning tool as management considers resource application in the pursuit of new business. If a customer requiring CATIA requested a quote on a pedal system, management would easily be able to tell that such a program would require a learning curve for the product team. Either an experienced CATIA designer would need to learn a new product or an experienced designer would need to learn a new skill. This information can then be evaluated against timing, profitability and strategic concerns with that program. As the company expands to more locations the rapid availability of this information will help management make better decisions about which business to pursue, and what future training is required.

Conclusions

Using the tree map concept provides a clear and quick way to visualize the knowledge resident in the technical center at the company headquarters. The benefits of this map are twofold. First, management is able to quickly and easily visualize shortcomings in knowledge, and take steps to align the strengths and weaknesses of the organization to the overall corporate strategy. Second, implementing such a map through the corporate intranet would allow individual employees to quickly find an employee that has the knowledge they desire to solve a particular problem.

Measurement gaps in survey. As mentioned earlier, there were some known gaps in the survey. Particularly apparent was the lack of non-technical questions, despite the presence of program managers, application group managers and other jobs that are not primarily technical in nature. The scores of these respondents must be considered relative to their experience. For example, the expert score of an application group manager in the A/T straight gate shifter category should not be construed as the same expertise as a Product Engineer III for the same category. Another example would be a Test Lab Technician and Principal Engineer scoring expert on adjustable pedal systems. Clearly, the technician considers himself to be an expert with respect to design and validation, while the expert engineer is applying knowledge to product design. Certainly, there is knowledge overlap between the two jobs and this overlap grows as the knowledge level increases. A highly experienced and expert lab technician certainly has ideas that could improve design and the experienced engineer is most likely well-versed in test set-ups. While a separate survey could be designed to measure the technical knowledge of non-technical jobs, it was determined to leave the

Exhibit 4



evaluation of the survey results to the individual user. Filtering the map for a particular job description should allow users to narrow their search results to the technical specialty required.

Finally, due to the independent nature of the survey, some respondents' experiences did not match with their self-assessed skill levels. One respondent from the applications engineering group listed 28 years of experience with a particular product, but listed his skill level for the same product as none, getting a zero skill score. The expected result would be for the most experienced respondents to have the highest self-assessments. One possible explanation for this is that the product experience may not have been in a technical area. For example, if the respondent had significant experience working on a manufacturing line for a particular product, but not much engineering experience, they might be reluctant to list themselves as an expert, despite their years of experience. One possible solution for this would be to have the survey results reviewed with a supervisor during the annual review process. This would add a second opinion to the self-assessment and should reduce similar errors in the scoring.

Gaps in scoring methodology. As discussed above, having the respondents choose between five skill levels simplified the execution of the survey instrument. However, in hindsight some minor improvements could have been made. Adding additional columns under each skill level would have given a higher resolution of results. The drawback with limiting the number of skill categories is that respondents may not be comfortable with the levels listed and there are no options for a self-assessment between, beginner and proficient. One possible manner to rectify this issue would be to add additional check boxes under each level. By having three check boxes under the level of expert, for example, would allow respondents to identify their skill as:

Expert -: Skills assessment does not require match up with the description for expert, but is clearly beyond that level of proficient.

Expert: Skills assessment matches directly or very nearly directly to the description for expert.

Expert +: Skills assessment does not quite match up with teacher/mentor, but is clearly beyond that of expert.

Again, one has to balance the desire for increased data resolution with the complexity of the survey. By adding two or three options below the skill level heading the respondent is given more choices for self-assessment with adding any real complexity to the survey instrument.

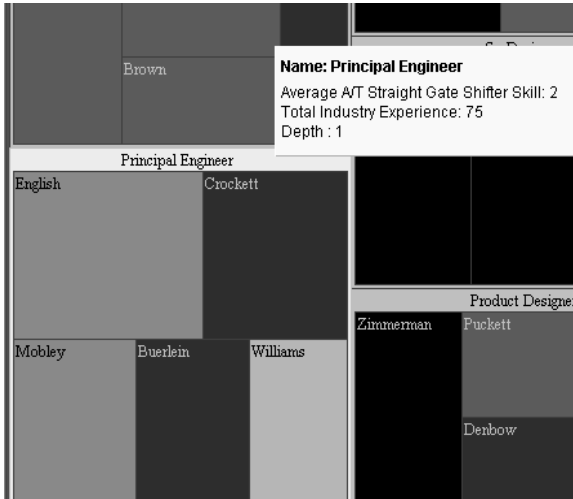
Identification of map strengths. As stated previously, the map is very adept at showing the areas of knowledge strength. Additionally, the versatility in organizing the data and adding or subtracting hierarchies allows for viewing the data in many variations. This is especially important for managers who might only want to view their department. For example, the Director of Applications Engineering can view only the people in his department by adjusting the hierarchy or adding filters to the results. If the Director of Organizational Development wants to offer mold flow training for engineers at the corporate headquarters, a visual representation can quickly show the number of engineers who might be interested in mold flow training.

An additional strength of the map and the mapping software is a summary display of the total attributes for a hierarchal group. For example, using the map from Exhibit 5 shows that the Principal Engineers have an average straight gate skill level of two, proficient, and a total of 75 years of industry experience. This summary of results allows relative comparison of groups over different hierarchies and legend values.

Identification of map weaknesses. There are only two identified weakness to the map. The first is the self- assessment portion of the survey ranks the responses by the following categories: none, beginner, proficient, expert, and teacher/mentor. These categories are then assigned a numerical value from zero to five. The numerical values are required to generate the color shading of the graph. Therefore, after reading the results of the map, a user who wishes to do

anything more than just make relative comparison must correlate the value back to the descriptions in the survey.

Exhibit 5



The second weakness in the map is the skill assessments are based on a scale of zero to five; the individual skill maps are only based on zero to the highest score. With this limitation, the colors of the skill levels do not correspond across skills. For example, the brightest green score for CATIA might be a five, but the same shade of green for Sigmund is only a score of one. This limits the visual comparison from skill to skill. However, since most use of the map will be within one skill set, it is not much of a limitation.

Recommendations

Upon completion of the knowledge map, the results were reviewed with three managers at the company: the Director of Applications Engineering, the VP of Human Resources, and the Human Resources Training Manager. All three managers agreed that the ability to map the knowledge of the firm in this manner would be a valuable asset and should be further pursued. During this review and the subsequent discussions, there were some recommendations for improvement and plans for the next step

One of the considered improvements for the knowledge map was to implement a separate survey of technical information for different groups. In other words, have one technical survey for engineers and a separate one for product designers. After further thought, it appears that the additional complication of developing separate surveys would not generate improved results, only more work developing surveys. A better alternative would be to develop surveys by broad knowledge categories, such as technical skill, customer interface, sales skills, manufacturing engineering skills, supply chain skills, etcetera, and then have every employee complete each survey. Engineers may have supply chain skills and purchasing managers may have some technical skills. Applying the same survey to different departments provides continuity across job functions for assessing skill levels.

In addition to developing more surveys and applying them to more departments, to be truly effective, the map needs to cover more locations than just the company headquarters. The true benefit of the map is to connect people who need knowledge with the people who have knowledge. The relatively small size of the company headquarters makes the map somewhat redundant, especially for the more obvious skill sets such as a particular product or CAD software. The greatest benefit will be in allowing multiple locations to access information about

the location of knowledge from a remote location. As the company expands into China, adding more people and locations to the fastest growing market in the world, there will be a great advantage in being able to quickly review who knows what on two continents. Adding additional locations will provide a more accurate picture of the corporate knowledge, as long as the information on the map is kept up to date and accurate.

One of the weaknesses of the knowledge management strategy employed was the use of self-assessments. With the self-assessment technique, there are three possible outcomes: modest under assessment, accurate assessment, and over assessment. Most respondents will likely not provide an accurate assessment, or skill assessment that does not correspond to listed experience. The simplest solution to this problem would be to have a second opinion about the survey, or to have the initial assessment be a self-assessment, and during the annual review process adjust the scores based on mutual agreement between the employee and her supervisor. For management skill assessment, the employee could provide feedback as to their managers' self-assessment. Annualizing this process would ensure two results.

First, the data used to generate the map would be not more than one year out of date. It is probably too much to expect the data for a couple of hundred employees to be updated more regularly than that. The second benefit of this approach would be the added focus on employee knowledge growth. Managers would have a clear picture of what areas their team needed more training in, and could balance that against their business objectives for the coming year. Since annual reviews are staggered throughout the year, changes in business strategy could be correlated easily to individual employee development plans.

Finally, the Human Resources Training Manager has begun the process of determining what job competencies should be included in surveys for other departments and skill sets. Determining what skills each department values, and how those skills transfer between departments is the first step in adopting the existing survey instrument for application across the entire company. With greater resources at their disposal, the Human Resources Department is working on a web based survey and web based solutions of the tree map.

The first test of any new tool in business is whether anyone is willing to invest time and money into the tool. To pass this test, the decision makers of the firm must feel that the potential payoff is worth the investment. Based on the feedback listed above, and the steps currently being taken to further implement this tool, it appears the idea of using a tree map to locate knowledge within a firm holds potential.

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About the Authors

Geoffry A. Twietmeyer is currently the Global Director of Engineering at GHSP, a supplier of mechatronics to the global surface transportation industry. He received a M.S. degree in Engineering Management from Western Michigan University, and a B.S. degree in Aerospace Engineering from Tri State University.

David M. Lyth is Professor of Industrial Engineering at Western Michigan University. He received his B.S. degree from Michigan Technological University before working as a quality control manager for two firms, a heavy metal fabricator and a healthcare equipment manufacturer. During that time he was certified as a *Quality Engineer* by the American Society for Quality Control. He received a M.S. from Western Michigan University and his Ph.D. in Production/Operations Management from Michigan State University. Dr. Lyth completed ISO-9000 Lead Assessor Training and worked with four firms as they achieved registration. His research has focused on the relationship of service quality to a variety of issues, including organizational culture and system design, ISO-9000 implementation and supply chain management. He has also studied service quality in the healthcare environment, specifically performing cultural analysis for a variety of hospitals across the United States. Dr. Lyth is co-founder and co-director of WMU's Engineering Management Research Laboratory.

Larry A. Mallak As founding principal of WMU's Engineering Management Research Laboratory, Dr. Mallak works with hospitals, healthcare organizations, and government organizations to measure and manage organizational culture. Dr. Mallak holds the rank of Professor in WMU's Department of Industrial and Manufacturing Engineering. An expert in organizational culture, he has worked with various healthcare systems, the U.S. Department of Energy, Westinghouse and the U.S. Army, among other organizations. A former management engineering consultant for a national healthcare network, Mallak studies and consults in the areas of organizational analysis, culture management and change, and employee surveying. He has Ph.D and M.S. degrees in industrial and systems engineering from Virginia Tech and a B.S. in industrial engineering from the University of Illinois at Urbana-Champaign.

Betsy M. Aller is Assistant Professor of the Industrial & Manufacturing Engineering faculty. She holds B.S., M.S. and Ph.D. degrees in Rhetoric and Technical Communication from Michigan Technological University, where she taught engineering communications and senior design. Prior to joining WMU, she was at Cornell University. Dr. Aller was Engineering Communications Manager at ODL and was Training Manager at Wyerhauser. Her research includes capstone design and professional skills development for engineering students.