Table of Contents
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Title . . . . . . 1
Welcome from the Editor . . . . . . 3
Advisory Editors . . . . . . 4-5
Table of Contents . . . . . . 7
Announcement for Mustang Las Vegas Conference . . . . . . 8
Announcements for Mustang Journals . . . . . . 9-13
Best Paper Award Winners . . . . . . 14-15

Lila Carden, Raphael Boyd, & Lori Boyer . . . . . . 17
Project Management and Legal Requirements Integration: A Model for Ethical Considerations

Leslie Campbell . . . . . . 24
Women Business Owners – Self-Described Perceptions about Personal Health and Wellness

Saba Bahouth & Tim Bridges . . . . . . 30
Impact of Forgetting on the Learning Curve and Productivity Improvement when Occurring over Intermittent Time Intervals

Joseph Trefzger & Richard Ringer . . . . . . 45
Breaking with the Past: A Critical Thinking Case Analysis

Lisa Houts . . . . . . 56
The Brownie Baker: A Recipe for Continued Growth

J. Katyayani & Sathya Rani . . . . . . 62
Benchmarking Practices for Employee Empowerment
PROJECT MANAGEMENT AND LEGAL REQUIREMENTS INTEGRATION: A MODEL FOR ETHICAL CONSIDERATIONS

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ABSTRACT

Organizations have noted that behaviors which are both ethical and legal are the underlying basis for enhancing competitiveness, stabilizing the bottom line, and marketing images (Cross & Miller, 2009; Driscoll, & Hoffman, 2009; McManus, 2009). Thus, it is important to understand the ethical dilemmas that confront project management teams and develop approaches and models to minimize the chances of behaving in unethical and legally irresponsible manners. This paper examines the project management and legal considerations of implementing projects by utilizing a model to discuss the integrating processes and considerations. The Project Management and Legal Requirements Integration Model, presented herein, provides a framework for project teams to discuss ethical and legal integrations and provides practical methods in which to communicate the importance and use of project management and legal integrations.

I. INTRODUCTION

Organizations have recognized the significance of practicing behaviors which are both ethical and legal, within internal and external stakeholders, as a business approach to enhance competitiveness, stabilize the bottom line and enhance marketing images (Cross & Miller, 2009; Driscoll, & Hoffman, 2009; McManus, 2009). Enron and other companies have served as examples of poor ethical and legal decisions that have experienced an enormous financial and marketing impact to internal and external stakeholders (Kliem, 2012). Thus, an entity is charged with providing environments that enhance ethical and legal behaviors in order to reduce or mitigate the chance that “a rank-and-file employee made or executed an unethical decision” (Kliem, 2012, p. xv) that costs the entity a significant financial loss. Another impact of unethical behavior includes the lack of consistency in implementing standards and values which result in a reduced reputation (The Ethics Landscape in American Business, 2012.).

The organizational competitiveness of the current day encourages “opportunities for several lapses in ethical judgment and action in some very open and subtle ways. Some of those pressures include an unrelenting pressure to produce faster, better, cheaper; to manage projects and programs spread across the globe involving different cultures with varying perceptions about what is ethical” (Kliem, 2012, p. xvi). Thus, it is important to understand the ethical dilemmas that confront project teams and develop approaches and models to minimize the chances of behaving in unethical and legally irresponsible manners.

As reported by Cross and Miller in 2009, ethics includes examining what is considered as correct or incorrect behavior. More specifically, ethics is concerned with morality and the ways in which moral principles are applied to our living both professionally and nonprofessionally. Legally responsible behaviors provide a basis for consistent and predictable actions that provide a framework for professional and nonprofessional activities (Cross and Miller, 2009). For example, ethical behaviors support respecting and treating others fairly as well as not causing harm.

Project teams are responsible for meeting the objectives of projects, satisfying stakeholders, identifying and handling project risks and completing deliverables (Helgadottir, 2008). Helgadottir (2008) has reported that project teams need to be “taught to think and debate ethically and that project owners should hire project managers that along with all the important tools of project management, have the ability to explain their ethical standpoint as well as manage the ethics of a situation” (p. 744). Therefore, project teams are responsible for assessing situations and making decisions that are ethical and legal when executing projects. To that end, PMI members and credential
holders are required to abide by a code of ethics. The Project Management Institute Code of Ethics and Professional Conduct (2013) states that “our hope is that this Code of Ethics and Professional Conduct will serve as a catalyst for others to study, deliberate, and write about ethics and values” (p. 1). Therefore, the purpose of this paper is to provide a framework to discuss the importance of project management and legal considerations to advance the professions and aid in making ethical decisions during project implementations.

To show the integrations of project management and legal requirements, this paper focuses on the following objectives:

- To provide a framework to discuss the importance of ethical behaviors and legal requirements;
- To use a model to discuss ethical and legal integrations noting the project processes as defined by Project Management Institute (2013);
- To provide practical methods in which to communicate the importance and use of project management and legal integrations in implementing ethically-related project activities.

II. ETHICS AND PROJECT TEAM MEMBERS

Process-oriented ethical theories maintain that the approach used to resolve ethical dilemmas predict its rightfulness or integrity (Helgadottir, 2008). Project management is a methodology that can be used to strategically frame the activities of the project manager and project team with the ultimate outcome of achieving productivity based on improving processes (Project Management Institute, 2013). To that end, since project management is process-oriented, one of the underlying ethical theories that can be applied to project teams is duty-based. Immanuel Kant is the main proponent of duty-based (deontological) ethics and the idea is that project team members should ask themselves “to whom do I owe a duty and what duty do I owe them” (“Deciding What’s Right: Ethics for Daniels Scholars,” 2010, p. 1). Duty-based ethics is focused on asking the questions related to what is my end result (Cross & Miller, 2009).

Kant’s ethical decisions are based on the following two principles: consistent behavior and behavior that is respectful to others (“Deciding What’s Right: Ethics for Daniels Scholars,” 2010). More specifically, as project team members, individuals should make decisions consistent across the board for all project management processes including project human resources, project risk management, and project procurement management. Additionally, duty-based theorist propose that “we should not act one way in some situations or with some people and another way in others” (Deciding What’s Right: Ethics for Daniels Scholars,” 2010). Employees are better able to understand themselves as having character because there is knowledge of human beings. More specifically, “only by understanding ourselves can we act on the work; only by knowing what we are and how we act can we think about the work and act in it” (Fontrodona, 2002, p. 196).

Project teams have been identified as one of the major factors contributing to project success by ensuring projects are delivered on time, within budget and meeting customer requirements (Kendra & Taplin, 2003). Therefore, Project Management Institute has instituted a code of ethics that includes five chapters discussing ethics and conduct. The Project Management Institute: Code of Ethics and Professional Conduct (2013) chapters discuss the following sections: vision and applicability, responsibility, respect, fairness, and honesty. More specifically, the code states that “as practitioners of project management, we are committed to doing what is right and honorable. We set high standards for ourselves and we aspire to meet these standards in all aspect of our lives – at work, at home, and in service to our profession” (“Project Management Institute: Code of Ethics and Professional Conduct, 2013, p.1). Therefore, the authors contend that project teams need to include representatives throughout the duration of projects in order to ensure universal applicability and respectfulness of others when making project-related decisions. Utilitarian ethics has been touted as a framework for making decisions and represents individuals making decisions and taking actions that benefit society (Deciding What’s Right: Ethics for Daniels Scholars,” 2010).
FIGURE 1: Project Management and Legal Requirements Integration Model

Project Management Body of Knowledge (Project Management Institute, 2013)

- Project Human Resource Management

Project Management Processes (Project Management Institute, 2013)

- Acquire Project Team
- Manage Project Team

Legal Considerations

- Hire/Fire
- ADA of 1990
- Title VII
- Training
- Bullying

Project Risk Management

- Risk Management Planning

Project Procurement Management

- Contract Planning
- Contract Administration
- Contract Closure

Laws and Regulations

Contract Law

Contract Negotiations

COMMUNICATIONS
III. PROJECT MANAGEMENT AND LEGAL REQUIREMENTS INTEGRATION

The *Project Management and Legal Requirements Integration Model* as identified in figure 1 herein includes the activities of project human resource management, project risk management and project procurement management (Project Management Institute, 2013). Each of the processes will be discussed in this section including legal activities that are conducted within each of the project management processes.

A. Project Human Resource Management

“Project Human Resource Management includes the processes that organize, manage, and lead the project team. The project team is comprised of the people with assigned roles and responsibilities for completing the project” (Project Management Institute, 2013, p. 255). “Plan Human Resource Management is the process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan” (Project Management Institute, 2013, p. 258).

Acquiring the project team includes obtaining the resources needed to complete the project activities and developing the project team includes enhancing skills and techniques, team member interactions, and the overall team atmosphere to support project performance (Project Management Institute, 2013). The legal processes for hiring and firing team members may require the skills of lawyers due to areas which include contractual agreements and labor restrictions (Kliem, 2013). More specifically, arbitrary employment at will considers the contract relationship of employees and considers the hiring and removal of employees, consultants and contractors (Kliem, 2012). Additionally, hiring practices must consider Title VII of the Civil Rights Act which prohibits employment discrimination and discrimination in all human resource activities including hiring, firing, training, promotions, transfers, pay, employee benefits and other employment activities (Bohlander & Snell, 2010; Cross & Miller, 2009). Thus, project legal team members are needed to ensure the aforementioned human resource activities are aligned with the applicable laws.

Developing and managing project team members include knowledge and skill acquisitions as well as managing team member interactions including harassment that can impact project team performance (Driscoll & Hoffman, 2009; Glendinning, 2001). Thus, the workplace must include a safe and healthy environment free from bullying and an environment that focuses on protecting the rights of employees including rights to privacy (Cross & Miller, 2009). Rights to privacy may include issues related to the use of equipment for personal use. Training is another component of project human resources and is a major process that is used to improve knowledge, create a collaborative team culture including reducing conflict and increasing team performance (Project Management Institute, 2013).

B. Project Risk Management

Project risk management includes the processes of planning, identifying, analyzing, responding and controlling risk (Project Management Institute, 2013). Project risk management focuses on employees’ behaviors and practices so that the employees make better decisions that are more aligned with the company’s philosophy about ethical, social, environmental and financial strategies. A risk management plan is the deliverable generated from the risk management planning process. The most important focus for planning risk management is to ensure “that the degree, type, and visibility of risk management are commensurate with both the risks and the importance of the project to the organization” (Project Risk Management, 2013, p. 313). Risk management planning involves gathering stakeholders including internal customers such as lawyers, external customers, senior leadership team, and the project management team to brainstorm the approach of managing risks (Kerzner & Saladis, 2006).

Legal noncompliance is one of the areas in which lawyers may identify as a risk category (Kliem, 2012). More specifically, “project managers and their team members can find themselves legally liable for failing to comply with laws and regulations, especially if their actions are not an expression of due diligence and due care” (Kliem, 2012, p. 25). Thus, laws and regulatory requirements should be adhered to and identified as risks because noncompliance could lead to penalties and poor public relations. For example, Sarbanes-Oxley, Sherman Anti-trust Act and environmental laws (Kleim, 2012) need to be identified as risks and therefore should include risk assessments and response plans for noncompliance (Project Management Institute, 2013). The expertise of a legal team member (internal stakeholder) is needed to assess the risk which includes a description of the risk, probability of risk occurrence, and impact of the risk to the project, response plan and risk owner (Kliem, 2012).

Plan risk responses include the process of developing opinions and approaches to maximize opportunities and minimize threats (Project Management Institute, 2013). The key outcome of this process is to analyze the risks...
by their priority and to include resources and activities into the schedule as needed (Project Management Institute, 2013). The response plan may include “establishing standards, procedures, and responsibilities to prevent illegal and unethical behaviors; due care in taking all the reasonable and necessary precautions to preclude harm” (Klei, 2012, p. 25). “Failure to take ‘reasonable’ behavior and actions to prevent harm can, from a legal perspective, place all stakeholders in harm’s way” (Klei, 2012, p. 25).

C. Project Procurement Management

Project procurement management is focused on the processes required to secure goods, services or results (Project Management Institute, 2013). The procurement management plan includes roadmaps for: types of contracts; risk issues; managing multiple suppliers; handling lead and lag times related to purchasing items; and decisions to procure or make supplies (Project Management Institute, 2013). Contract planning includes the processes of recording procurement decisions, identifying the approach and identifying sellers. Procurement negotiations include “responsibilities, authority to make changes, applicable terms and governing law, technical and business management approaches, proprietary rights, contract financing, technical solutions, overall schedule, payments and price” (Project Management Institute, 2013, p. 377). Legal contractual relationships usually include firm fixed price contracts, fixed price incentive fee contracts, fixed price and economic price adjustment contracts, cost plus fixed fee contracts, cost plus incentive fee contracts, and cost plus award contracts (Project Management Institute, 2013).

Contract administration for procuring goods and services includes negotiating the contract and controlling procurements, the procurement relationships, and monitoring the contracts. For example, “breach of contracts and agreements involves negotiating contracts or enforcing compliance with contracts both from a buyer and seller perspective” (Klei, 2012, p. 26). Project managers with the assistance of lawyers must conduct and control contracts and agreements including terminating a contractual relationship for breach of contract. Other project management-legal related issues include conflict of interest. For example, a project team member who is involved in contract negotiations with an entity in which he or she owns an interest in the company has a conflict of interest and should not participate in the negotiations (Klei, 2102). Additionally, “stakeholders on a project that may involve making a major procurement agreement with another company could have a substantial impact on the price of its stock. This may tempt some team members to use that information to purchase additional shares of stock” (Klei, 2102, p. 27). Closing contracts includes completing administrative components of the contract, updating records and handling unresolved claims that may include litigation to resolve (Project Management Institute, 2013).

D. Project Communications

Sotiriou and Wittmer (2001) determined that team members were more likely to comply with communications from project managers who have professional integrity as demonstrated by truthfulness, follow-through, and assuming responsibility. The authors contend that project communications management is listed as an overarching project process that needs to be implemented in order to report the integrations between project management and legal with an end goal of developing a road map for project managers to work with legal representatives as team members throughout the duration of the project life cycle.

“Project Communications Management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information” (Project Management Institute, 2013, p. 287). The communication activities that are aligned with executing the processes include (a) communications with internal and external team members and stakeholders including communication to senior leadership and peers; (b) developing formal documents including reports, minutes, briefings, emails and memorandums; and (c) verbal and nonverbal communications including body language. The skills that are needed for effective communication include: active and effective listening; feedback concerning communicated ideas; managing expectations; persuasion; motivation; coaching; negotiation; problem solving; and summarizing and identifying the next steps (Project Management Institute, 2013). Tools and techniques that are used to communicate project status, findings, and project-related documents include: communication requirements analysis, communication technology, models, and methods (Project Management Institute, 2013). Successful project management requires effective and ethical communication between the team leader and the team members. These interactions build the team’s focus and provide the foundation for each member’s contribution to a positive outcome (Brenner, 2007).

IV. CONCLUSION
Project management involves collaboration, and often the value of the ethical dialogue is reaching a common understanding among the team as to its appropriate course of conduct. Therefore, the Project Management and Legal Requirements Integration Model presented herein (a) provides a framework for project teams, project team members including legal representatives, to discuss ethical and legal integrations; and (b) provides practical methods in which to communicate the importance and use of project management and legal requirements in implementing ethically-related projects.

Ethical issues can result in legal and financial issues and may be often difficult to identify and thereafter determine a course of action (Cross & Miller, 2009). “Legal noncompliance is an issue that often gets the most attention because failure to comply has severe impacts, such as criminal and civil penalties, which can be applied to organizations and individuals alike. Ensuring adherence to laws and regulations, such as Sarbanes-Oxley, Sherman Anti-trust Act, and environmental laws, becomes absolutely essential to avoid penalties and bad public relations” (Kliem, 2012, p. 25). Project team members can be legally liable for failing to abide by the rules and regulations as defined by laws and regulatory agencies.

Organizations should also consider maximizing the benefits of project management and legal integrations after adoption of various processes and procedures. The following success factors for project execution include (a) creating a culture that recognizes ethical behaviors; (b) individual team member who are committed; and (c) communication channels that are open and honest (Cross & Miller, 2009; Kerzer & Saladis, 2006). Additionally, some of the strategies utilized to reduce or negate unethical behaviors include professional codes of conduct, greater self-regulation, and quality practices enacted by consumers (Fellows, Liu & Storey, 2004; Kleim, 2012). The underlying principle of management is that when technical and humanistic aspects of actions intersect, the resolution of action includes identifying the relationship between the two and reaching a synthesis (Fontrodona, 2002).

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WOMEN BUSINESS OWNERS –
SELF-DESCRIBED PERCEPTIONS ABOUT PERSONAL HEALTH AND WELLNESS

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ABSTRACT

This study surveyed women business owners to discover self-described perceptions of their health and wellness and to identify any links among variables including large and small age cohorts. Several areas of literature were examined including women business owners, definitions of health and wellness, and women’s health issues. A comprehensive definition of health and wellness was used that included psychological, physical, emotional, social, spiritual and environmental components as proposed by Edlin and Golanty. By obtaining qualitative and quantitative data from the participants, specific behaviors and perceptions were identified through objective surveys, as well as subjective information which was collected through personal interviews. One of the key findings indicates that, while older women business owners may have a poor self-perception of their physical health, they exhibit positive insight and behavior regarding spiritual and emotional health and wellness. The conclusion provides suggestions for future research in this growing field of women entrepreneurs.

INTRODUCTION

Throughout history, there are records of the different roles women assumed in the workforce and though the positions were primarily related to domestic service and other similar activities, women could be found in agriculture, plantation management and other entrepreneurial activities. As the world moved towards industrialization and the economy changed from home production of goods to large-scale factory production, labor became more a means of much needed income for women and they moved into other service-related fields, such as teaching, nursing, and the hospitality industry, and later into fields such as office support and manufacturing.

As women became more educated and gained more business experience, they realized they had different skills and services they could offer as entrepreneurs. In addition, the appeal of self-management, not to mention the flexibility of creating one’s own schedule, prompted many women to become business owners. Growth in women-owned businesses increased rapidly between 1997 and 2006. This increase offers the opportunity to study the effects of the pressures of trying to achieve work-life balance. Understanding the centrality of a healthy lifestyle to personal well-being, this study examines the self-described perceptions that women business owners have towards their own personal health and wellness.

DEFINING HEALTH AND WELLNESS

After review of many descriptions, the definition of health and wellness as offered by Edlin and Golanty - “health as the totality of a person’s existence recognizes the interrelatedness of the physical, psychological, emotional, social, spiritual and environmental factors that contribute to the overall quality of a person’s life” – was used in this study, largely due to its all-encompassing characteristics and especially their suggestion that health is a process rather than an inert state. (Edlin & Golanty, 2007).

RESEARCH QUESTIONS

The objective of this study was to research and understand the behaviors exhibited by female business owners towards health and wellness and if possible, identify factors influencing said behavior. To that end, the research questions framing this study are:

- Are there specific patterns in wellness practices exhibited by female business owners?
Does membership in a certain age cohort have any bearing on behavior?
• Are there differences between two larger age groups—Baby Boomers and Generation X-ers?
• Are there differences in behavior within age cohorts with a smaller range?
• Do female business owners pay more or less attention to their health and wellness versus the attention given to their business and/or family?
• Do female business owners place more importance on physical health than on mental health? If so, how is this manifested? If not, is there a definable reason or reasons why?
• Does the financial success or failure of their business have an impact on health and wellness?
• Are there specific demographic characteristics, besides age, that affect behavior or attitudes towards health and wellness?

DESIGN AND METHODOLOGY

Research Design
The strategy for this study was a two-phase design. The first was a descriptive design using the Health-Promoting Lifestyle Profile II (HPLP-II) survey in conjunction with a demographic questionnaire to gather quantifiable data on participant’s behaviors, attitudes and descriptive information, including but not limited to marital status, level of education, number of children, and financial success of business. During the second phase, a series of interviews with a group of willing participants was conducted in order to better understand the relationship between demographics and perceptions of health and wellness.

The HPLP-II consists of fifty-two questions with responses based on a four-point Likert Scale (N for never (1), S for sometimes (2), O for often (3), R for routinely (4)). These questions examine particular lifestyle issues that fall into six subscales - spiritual growth, physical activity, nutrition, interpersonal relations, stress management, and health responsibility. The statements require participants to respond to particular issues such as, frequency of exercise, eating foods from different food groups, existence of support groups, feelings of harmony, responsibility for one’s well-being, and utilization of resources to minimize the effect of stress. This survey is typically scored by calculating a mean of a participant’s responses to all fifty-two items. The subscales are scored the same way permitting comparisons across the subscales (Walker and Hill-Polerecky, 2011).

The second quantifiable survey queried participants on demographic information. This data was needed to place participants in comparable and opposing groups in order to study similarities and differences. This survey was designed by the author and includes thirty-nine questions in this survey. Each question has a different set of possible answers based on the nature of the question. The survey is scored simply by tallying the scores for each or all participants, depending on what variable is being tested.

The second phase of the design involved interviewing a select group of participants in order to better understand the quantifiable results obtained through the aforementioned survey and questionnaire. Interview questions were developed based on the responses to the questionnaire that related to the following sub-scales – interpersonal relationships, spiritual growth and stress management. The questions were designed as open-ended in order to elicit thoughtful responses from the participants. Interviews were scheduled for one to two hour sessions. Participants were contacted through email after they submitted their quantifiable survey responses to confirm willingness to participate, availability and preferred method of contact.

Guidelines Used for Identifying the Sample Group Characteristics
The sample size was targeted at one hundred (100) women with an acceptable response rate of twenty-five percent (25%) and each participant was required to be a female business owner. Businesses chosen were in any industry sector as well as franchisees of larger corporations based on the autonomy often allowed these types of owners. Most participants’ businesses were located in New Hampshire; however, taking into account the possibility of referrals from participants, some were from other states.

Using membership directories from several New Hampshire-based Chambers of Commerce, the author sent out an email requesting participation in a survey for women business owners to one hundred and ten (110) potentials participants. The response rate was 34% (thirty-seven women). Of the thirty-seven respondents, eight indicated they were willing to be interviewed. Upon further email contact, six agreed to be interviewed.

Standardized open-ended questions were used because the author wanted to ask the same questions of all participants in hopes of identifying trends. While no specific hypothesis was originally identified for this research, the author anticipated that the data would demonstrate that female business owners have positive mind-sets and
behaviors (perhaps even proactive) regarding health and wellness. The author expected the data to show that differences did exist either between or within different age cohorts regarding behavior and attitudes.

**Quantitative and Qualitative Data Collection and Analysis**

The data was initially separated into results for two age cohorts – ages 25-45 and 46-66, Generation X-ers and Baby Boomers respectively. Through SPSS™ (IBM® SPSS Version 19 for Microsoft Windows was used for this study), analysis of variance (ANOVA) tests were run on each of the six sub-scales of the HPLP-II to determine if any significant differences existed. All analyses were conducted and all results were accepted at the .05 level of significance. Next, the two larger age groups were divided into smaller age groups for further testing and analysis. These age groups were – 25-35, 36-45, 46-55, and 56-66+. Descriptive statistical analyses were run on each group for each of the six sub-scales, for a total of 24 sets of data. This data was reviewed to determine significance at .05 level.

Based on the data derived from the surveys, six questions were developed for the qualitative phase. It was the author’s intent to further explore the three specific subscales from the HPLP-II - interpersonal relationships, stress management and spiritual growth.

### Spiritual / spiritual growth / mental health
1. Tell me about the ways you look forward to the future.
2. Tell me how the success of your business has either met or not met your expectations and how this motivates you.
3. Please explain why you believe you are either close to or ahead of where you thought you would be at this point in your life and how this motivates you.

### Psychological / stress management / mental health
4. Please explain what is most stressful in your life and why is it so.
5. Tell me about the things you do to balance your time between work and play.

### Emotional / Interpersonal relations / mental health and stress management
6. Tell me about the support you get from your network of personal and professional friends and how this helps you.

The initial approach to this study was to control for age and to review possible differences in responses to questions that fell under the six subscales of the HPLP-II - spiritual growth, health-promoting lifestyle, physical activity, nutrition, interpersonal relations, and stress management. Results of the ANOVA between the groups failed to show any significant difference between the responses of the age cohorts. As evidenced, the differences were negligible; thereby suggesting that age cohort held little difference in assessing the perceptions covered by the HPLP-II. The two larger age cohorts were further divided into four smaller groups. These smaller groups were 25-35, 36-45, 46-55, and 56-66+. Descriptive statistics were run on each group for each of the six subscales. In all, twenty-four sets of descriptive tests were run in order to determine what, if any, differences existed based on standard deviation within the smaller groups.

**QUANTITATIVE RESULTS**

### Age Group One – 25-35 years of age

This was the smallest cohort consisting of only three respondents. A group of this size is too small to provide any meaningful data; however, it is interesting to note some of the consistencies and differences in their responses. Of the six subscales of the HPLP-II – spiritual growth, health-promoting lifestyle, physical activity, nutrition, interpersonal relations and stress management – the area with the most statements with response variance for this group was the physical activity area, where there was recorded deviation on five of the eight related statements.

Based on their responses to all of the HPLP-II questions, one can infer that this group of women albeit small demonstrates a tendency to try to engage in health-promoting behavior for the sake of themselves and their children, despite the admitted stress of balancing business and family responsibilities. Their perceptions of health and wellness were fairly consistent with each other, indicating similarities within this age group likely based on comparable demographics. In total, this group recorded “routinely” or “often” as their answers 67% of the time,
indicating overall positive self-perceptions of good health with respect to all six components of the definition of health.

**Age Group Two – 36-45 years of age**

This age group totaled eleven respondents, tied with the 56+ age group for the second most number of participants. Although larger than the first group, there was a similarity in the deviation of responses between the two for one subscale. Both groups saw the most deviation in answers in the physical activity subscale. Based on these responses, one might assume that other subscales have similar tendencies. This does not appear to be true. While there were variances among the responses within the subscales, there were trends that appear to be opposite of the low physical activity scores. In the health-promoting lifestyle and the nutrition subscales, the majority of responses fell in the “routine” and “sometimes” categories, indicating self-described perceptions of positive or even proactive behavior. What we can surmise about this group is that despite logging the most work hours and feeling equally stressed about their business and their family responsibilities, they remain optimistic about their future, looking forward to it while having an awareness of what is important to them in life. The self-described perceptions of health and wellness for this group also appeared to be somewhat consistent among all participants. In total, this group recorded “routinely” or “often” 60% of the time, indicating overall positive self-perceptions of good health with respect to all six components of the definition of health.

**Age Group Three – 46-55 years of age**

This age group was the largest of all four, with a total of twelve respondents. Unlike the first two groups, the physical activity subscale is not where the most deviation lies. The most variance in responses was found in the stress management subscale for this group, with significant variance on four out of six statements. The responses were fairly evenly split between “routinely,” “often” and “sometimes,” with no particular consistency among them. With half of the women reporting that they have children, we are beginning to see the effects of belonging to the sandwich generation for these respondents. The National Longitudinal Survey of Young Women identifies the sandwich generation as those persons, particularly women ages 45 to 56 years old, who are supporting for their own children and their parents (bls.gov, 2006). Support can mean residing with, providing financial assistance or help with activities of daily living including errands for elderly parents or childcare for children or grandchildren. Given this distinct possibility, it is easy to see why this group’s responses to stress management questions were so varied.

It is reasonable to infer that there is a growing success for the older groups with this subscale which, according to Walker and Hill-Polerecky, “focuses on the development of inner resources” (1996). This kind of inner development is a direct result of life experiences and allows one to draw on those in order to look to the future and find purpose in one’s existence. Overall, there was consistency within this group regarding their perceptions of their health and wellness. In total, this group recorded “routinely” or “often” for their responses 73% of the time, indicating overall very positive self-perceptions of good health with respect to all six components of the definition of health. One can suggest that, in spite of the high level of stress, they find meaning in their work and family which might have a mediating effect on stress and a positive effect on their perception of a healthy lifestyle.

**Age Group Four – 56 + years of age**

This group has the same amount of participants as our second group – eleven participants. According to the BLS standards mentioned earlier, this group is also considered part of the sandwich generation which may impact their responses. An interesting observation about this group - more than half stated that they regularly engage in faith based activities, resulting in a higher percentage than any of the other three groups.

Reviewing the six subscales, the area that demonstrated the most variance in responses for this group was the health promoting lifestyle in which seven out of ten statements had noticeable variations. Responses varied between all four options with the most responses coming in as “sometimes.” The statement that received “routinely” as the predominant answer was “question health professionals in order to understand their instructions.” This is positive in that this group is exhibiting proactive behavior by having conversations with health care professionals which is important in maintaining good health. They are also getting older, are probably more apt to visit physicians and to be concerned with making sure they are following advice.

Overall, there is consistency within this group regarding their perceptions of health and wellness, indicating like-mindedness on the areas covered by the HPLP-II. In total, this group recorded “routinely” or “often” 70% of the time, indicating overall very positive self-perceptions of good health with respect to all six components of the definition of health.
Based on the results summarized here, it can be inferred that, three groups in this research – the three older age cohorts - have expressed strong perceptions of positive health in the spiritual growth component of the total health definition which is important to mental health as discussed in the literature review. One group, the youngest group, demonstrated their perceptions of positive health within the psychological (stress management) component.

Conversely, one can also conclude that, because of the considerable variation of responses in three subscales among the three older groups, these participants have self-described low perceptions about their state of health and wellness in the components of physical (physical activity), psychological (stress management) and environmental (health promoting lifestyle). Based on the overwhelmingly positive perceptions in the spiritual component among these three groups, it was determined that further research should be conducted in this particular area using qualitative methods.

**Qualitative Interviews**

In planning this qualitative research component, open-ended questions were developed to allow the participants the opportunity to communicate their attitudes and beliefs, while keeping the questions to a minimum number out of respect for their time. There were no expectations on the part of the researcher as to what the answers might be, though it was anticipated that trends would emerge based on the responses to the questions. None of the participants had prior or subsequent knowledge of what the others had said. It is worth mentioning that each interviewee’s business is in the service industry. The length of time each has been in business ranges from just a few years to over twenty. One of the respondents recently closed her business due to the economy. Each of the interviewees falls into the third age cohort of the study – ages 46-55.

The participants who were interviewed expressed hopefulness for their futures, despite experiencing personal and professional setbacks in the past. These women run their own companies and in many cases run their households as well and are able to remain focused on both their personal and professional futures. As much as they are committed to their businesses, they are committed to themselves as they struggle and strive to manage the stress in their lives in an attempt to maintain good mental health and, to a related extent, good heart health.

**DISCUSSION AND FUTURE DIRECTION FOR STUDIES OF TODAY’S WOMAN BUSINESS OWNER**

In general, the women in this study appear to have sanguine perceptions about their overall health and wellness. Clearly there are areas in which they admit that more proactive behavior could be employed in achieving good health. Regardless, the data reviewed in this study holds implications for a number of fields. Business administration researchers could review financial success and its link to any number of variables, including but not limited to the owner’s perception of her health, education level, or the number of other businesses started by the participants.

Health care researchers may want to examine any number of variables from this data including but not limited to diet and nutrition habits, stress management, exercise frequency and relationship issues. In the area of health care policy, researchers may want to understand frequency of medical office visits along with educational programming, relationships with medical professionals and self-directed preventive behavior.

Researchers in the mental health field may find this study and its data rich with exploratory opportunities, particularly in light of the results of the statistical testing of the spiritual growth subscale perhaps to uncover possible links to other mental health issues or diagnoses. With stress being linked to so many mental and physical health illnesses, experts in this area may find this to be another vital area for research.

Relationship researchers may find this study to be helpful or even to hold the key to questions because of the interpersonal relationship subscale responses. More in-depth studies could be conducted that includes more probing questions of the participants on their relationships with their spouse or significant other, children, friends or business associates.

**LIST OF WORKS CITED**


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IMPACT OF FORGETTING ON THE LEARNING CURVE AND PRODUCTIVITY IMPROVEMENT WHEN OCCURRING OVER INTERMITTENT TIME INTERVALS

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ABSTRACT

Learning rate and learning curves, as in job learning and productivity improvement, have been studied and formalized since the 1930s. The impact of job interruption - which results in forgetting - on job learning, productivity, and process capability, is more complex as it depends on learning, memory, and memory retrieval after a period of interruption. In this simulation study we try to gain a better understanding of the impact of forgetting that results from interruption when interruption occurs over intermittent time intervals. Results show that production or process capability loss could be as high as eighteen percent. Results also show that properly managing these interruptions and reducing them by slightly more than twenty percent will result in recovering around fifty percent of the lost process capability. The results of this research should help managers appreciate the impact of moving employees to work temporarily on new tasks, and the necessity to properly manage these interruptions to regain some of the productivity loss.

Keywords: Learning curves; Forgetting; Work interruption; Productivity; Simulation

INTRODUCTION

Learning, as in repetitive task learning, has major impact on labor productivity improvement. It was documented and modeled as far back as the 1930s. The rate at which an active organization “learns” while producing a product has been found to follow the same power function models as the ones used for labor learning and productivity improvement.

Such production progress occurs in most industries and at different rates. It continues for large numbers of units and, in a real sense, is the antithesis of standard costs because production progress causes costs to drop by more or less the same percentage as we double our total production. Production costs are therefore constantly changing whether manufacturing an item or performing a service.

Knowledge of production progress functions is important to those who are involved in cost analysis and the pricing of products and services. Results can be used in the training arena, manufacturing economic analysis, manpower requirements and scheduling, production planning, bid preparation, budgeting, and overall resource allocation.
Understanding how productivity is improved by cumulative learning through repetitive tasks would be beneficial in many areas of business processes. Possible uses include:

- Improving budgeting accuracy in managerial planning and control of operating costs.
- Enhancing performance measurement by inclusion of a “learning effect variance”.
- Employing learning in Break Even Analysis to better define the variable cost per unit.
- Evaluating the effect of pre-production planning in flattening the learning curve.
- Improving production plans for both the organization as well as its supplier.
- Improving the forecast of the delivery schedules for both the organization as well as its supplier.
- Using learning to compute the economic order quantity or the economic production quantity.
- Managing accident frequency during the period before learning is complete.
- Adjusting the level of warranty required on newly introduced products.
- Developing accurate sales figures and adjusting production schedules accordingly.
- Incorporating the learning phenomenon in aggregate planning.

In more recent years we saw an increased interest in research in the area of forgetting and its impact on productivity deterioration. This study focuses on learning and forgetting where learning is assumed to be continuous with forgetting occurring intermittently and for varied period lengths.

**KNOWLEDGE ACQUISITION AND KNOWLEDGE LOSS**

Knowing some aspects of the brain functions is necessary for a better understanding of learning and forgetting.

**Learning**

The brain does not store a picture of an event. It does not directly record anything that it is shown. What the brain does is store a record of neural activities that take place in the learner’s sensory and motor systems as they interact with the environment. Thus, when a learner places an image in his mind, he stores components in many different places and constructs pathways among the places so that the entire system of storage and pathways can fire up as an image when the learner recalls the experience.

The only way the brain absorbs data is through the sensory perceptions that enter through the body’s five senses. Anything that a person does, perceives, thinks, or feels gets processed through complex systems of pathways and storage. The brain categorizes non-language sensory perceptions of the world in different places. Shapes and colors are stored in different places. Movement, sequence, and emotional states are also stored separately. Textures and aromas are stored elsewhere. Aspects of language are also stored in various parts of the brain. Nouns are separated from verbs, and phonemes are separated from words. As the brain constructs connections among the brain cells, it connects the organizations of words, objects, events, and relationships in successively interwoven layers of categories. The result is that human knowledge is stored in clusters and organized within the brain into systems that people use to interpret familiar situations and to reason about new ones (Lowery, 1998). Sprenger (1998) calls the separate pathways to the information stored in various areas of the brain as memory ‘lanes’ and she has identified five separate lanes: semantic, episodic, procedural, automatic, and emotional.

The procedural memory lane is found in a brain structure called the cerebellum. Neuroscientists believe that the physiological process underlying procedural memory is one in which brain cells (neurons) that “fire together, wire together.” In other words, circuits or networks of neurons that are used over and over get accustomed to firing together and eventually become hard wired and fire automatically.
Rehearsal takes place when people do something again in a similar but not identical way to reinforce what they have learned while adding something new. New additions increase the likelihood that the knowledge learned is not task-specific. Non-task-specific experiences increase the likelihood that the knowledge will be transferable and useful in a variety of ways. Rehearsals strengthen the connections among the storage areas within the brain systems (Lowery, 1998). If connections are not strengthened, they will disengage and fade away. People do not lose the knowledge that allows them to function, they merely lose the network to that information and therefore another path must be established.

Hancock and Bayha (1977) researched the fact that learning can be separated into two major areas: that which occurs when a person is performing a task repetitively and that which occurs while an organization produces many units of a particular product. The former area is called “human learning”, and the latter the “production progress function”, a term generally used in the literature.

“Threshold Learning” is defined as that learning which takes place prior to workers barely knowing how to do a job without external assistance. Very little productive learning takes place during this incipient period. Threshold learning is not included in the learning curve model and equations.

At the early stages of learning, the operator uses his cognitive system to perform the task correctly, i.e., follow instructions, remember the sequence of operations, develop the correct method, etc. As experience is gained in task execution, the time spent on cognitive learning is sharply reduced and the performance time is dominated by motor learning. At the early stages, cognitive abilities are dominant, whereas later, the motor activities become the limiting factor (Fleischman and Rich, 1963).

Learning models
The early and pioneering study of T.P. Wright (1936) resulted in introducing the power function to labor productivity improvement when performing repetitive work. A power function of the following form was adopted (Refer to Appendix A for a graphical representation):

\[ T(s) = as^{-m} \]  

(Eq. 1)

Where:
- \( T(s) \) is the performance time of the \( s \)th repetition
- \( a \) is a starting point parameter (\( a = T(1) \))
- \( s \) is the cumulative number of repetitions
- \( m \) is a curvature parameter = \(- \log \Phi / \log 2\)
  - where: \( \Phi \) is the learning rate; \((1 - \Phi)\) is the progress ratio

The general form for exponential equations modeling learning curves with a learning ceiling are of the following form (Refer to Appendix B for a graphical representation):

\[ y = k(1 - e^{-tR}) \]  

(Eq. 2)

Where:
- \( y \) is some measure of learning performance measure
- \( k \) is a parameter that define the predicted asymptote for performance ceiling
- \( e \) is the base of the natural logarithm
- \( t \) is the amount of time or the number of trials of training, study, or practice
- \( R \) is a parameter for the learning rate defining how quickly the asymptote is reached

Extensions on learning models that were developed over the years include:
v. 4, Mustang Journal of Management & Marketing, 2014

- The S-curve Model (Carr, 1946).
- DeJong’s Learning Formula (DeJong, 1957).
- Levy’s Adaptation Function (Levy, 1965).
- Glover’s Learning Function Model (Glover, 1966).
- Knecht’s Upturn Model (Knecht, 1974).
- Yelle’s Product Model (Yelle, 1976).
- Globerson (1980) and Hancock (1967) Linear Model.

Multivariate models have not received the attention they deserve in practice. This is perhaps due to the complexity of implementing the models for practical productivity assessment. These models are typically of the form:

\[ C_x = K \prod_{i=1}^{n} c_i x_i^{b_i} \]

Where:
- \( C_x \) is the cumulative average cost per unit for a given set of factor values.
- \( K \) is model parameter (cost of first unit of the product)
- \( c_i \) is a coefficient for the \( i \)th factor
- \( x \) is a vector of specific values of the independent variables
- \( x_i \) is a specific value of the of the \( i \)th factor
- \( b_i \) is a learning exponent for the \( i \)th factor
- \( n \) is the number of factors in the model

For simplicity and ease of analysis, the above model is often reduced to a bivariate model of the type:

\[ y = \beta_0 x_1^{\beta_1} x_2^{\beta_2} \]

Where \( \beta_0, \beta_1 \) and \( \beta_2 \) are constants.

**Forgetting**

The term forgetting is a descriptive term used to refer to any decrement in performance that occurs in a retention test. Such use says nothing about the integrity of memory. If memory is tested for retrieval and the result is positive, it is determined that the memory is in storage, but we can never really assert that a memory is not in storage when retrieval does not occur.

The well-known 1885 findings of Herman Ebbinghaus (translated into English in 1913), in his thesis *Memory: A Contribution to Experimental Psychology*, noted that retention was “negatively accelerated” during a break, i.e. the rate of forgetting slows over time. While the effect of learning on the Economic Order Quantity (EOQ) has been considered in the literature, the effect of forgetting has been largely ignored. Cochran (1968) suggested that retrogression is a function of the quantity produced to date and the length of the interruption with all other variables remaining the same. Steedman (1970) and Carlson and Rowe (1976) claimed that the length of the break and the performance time just before the break are the main contributors to the forgetting process. Womer (1984) argues that production breaks can cause forgetting only if the workers are involved in non-
complementary operations during the breaks and concludes that there is a positive correlation between recall loss and the length of the break, but this recall loss is minimized if activities during a break use information that is similar to the previously learned information.

**Forgetting models**

Sule (1978) studied the effect of alternate periods of learning and forgetting upon the Economic Manufacturing Quantity. He argues that since forgetting occurs whenever there is a job interruption, then this interruption should result in a subsequent drop in the production rate at the beginning of the next production cycle, and that the drop is dependent on the length of the interval and the production rate when the interruption occurred. This relationship is modeled with:

\[ Y_F = X_F R_F^{B_F} \]

Where:

- \( Y_F \) is the number of units that can be produced on the \( R \)th day after interruption
- \( X_F \) is the number of units that could have been produced on the first day of interruption
- \( R_F \) is the cumulative number of days in the forget cycle, or the length of interruption
- \( B_F = 3.32 \log (\text{Forgetting Rate}) \)
- \( F \) is a letter referring to forgetting to differentiate this model from the learning models.

Sule gives a procedure based on the above derivation for determining the EOQ for the finite production model that incorporates both learning and forgetting and finds the optimum value of the quantity that minimizes yearly cost.

Globerson and Levin (1995) argued that forgetting is a more complex process and introduced the impact of several other factors including turnover, communication, and documentation.

Bailey (1989), in his review of the relevant literature, pointed out that according to psychological research: (a) the most important factor affecting forgetting is the level of learning achieved before any break in the learning process; (b) the learning rate and the complexity of the task do not influence the forgetting rate; (c) the time required to achieve the original performance level when relearning is much less than the original learning period; and (d) the learning rate is highly correlated with the time taken to complete the first repetition.

Bailey and McIntyre’s study (1997) concluded that, after a period of forgetting, relearning curves that start anew are better predictors than those that back-up a learning curve.

Arzi and Schtub (1997) looked at the differences between learning and forgetting in mental and mechanical tasks. They found that the effect of forgetting on mental tasks was larger than that on mechanical tasks by approximately 25%. They also claimed that the ability of an individual to remember (to forget less) is correlated with learning capability.

Jaber and Bonney (2007) reported on a number of studies related to learning and forgetting applied in a batch production process. A batch learn-forget-relearn approach based on the log-linear model was simulated and analyzed by Davidovitch et al. (2008). They found that forgetting is minimized and therefore the lot size is optimized when using a smaller batch size.

Kleiner et al. (2012) extended the work of Benkard (2000) which studied learning and forgetting in an aircraft production environment. They considered additional variables that were not used by Benkard and found that these variables have little effect, concluding that forgetting does not have as big an impact on task performance as suggested by previous work.

Badiru (1994 and 2012) refers to three potential cases for the occurrence of forgetting:
1. Forgetting occurring continuously throughout the learning process.
2. Forgetting occurring only over a bounded time interval.
3. Forgetting occurring over intermittent time intervals where the time of occurrence and the duration of forgetting are described by some probability distributions.

Based on his previous research, he suggests the following two models for learning $l$ and forgetting $f$, both of which are dependent on time $t$ and production unit $u$:

$$l(t, u) = 20t^{0.09} + u^{-0.05}$$
$$f(t, u) = t^{-0.20}u^{-0.30}$$  \hspace{1cm} (Eq. 3; 4)

He also suggests a point-by-point average of the learning and forgetting functions: If learning $l$ and forgetting $f$, which are dependent on time $t$ and unit $u$, start at a particular performance level, the resultant performance function, $r(t,u)$, may then be modeled as:

$$r_0(t,u) = l(t,u) - \frac{l(t,u) - f(t,u)}{2} = \frac{l(t,u) + f(t,u)}{2}$$  \hspace{1cm} (Eq. 5)

That is the forgetting curve causes a downward pull on the learning curve which gives the resultant $r_0(t,u)$ curve.

In his renowned 1994 paper, Badiru addresses the first two forgetting cases, but does not address the third case saying the third case is a matter for future research. In the following experimental model we explore the impact of forgetting on learning and productivity improvement when forgetting occurs over intermittent time intervals during a continuous learning process.

**METHODOLOGY AND EXPERIMENTAL MODEL**

This study addresses forgetting that occurs in conjunction with learning. Therefore the total amount of information available for recall at any moment of time, $r(t,u)$, is a resultant of the interaction of learning and forgetting acting simultaneously (Example 1: moving from job A to job B for a certain period of time, where some aspects of new job B are similar to other aspects of old job A. Example 2: having to take off from work for a while for some training in safety that is related to the job). In this case forgetting is assumed to be an intermittent process during continuous learning: there will be times when only learning is occurring and times when the resultant net learning is diminished by a certain level of forgetting.

An extensive analysis of the forgetting function $t^{-0.20}u^{-0.30}$ was conducted to validate the two exponents. It was soon realized that the exponents -0.20 and -0.30 result in a level of forgetting that is not comparable in magnitude to the learning when dealing with intermittent forgetting. Several combinations of the exponents were studied and that resulted in the following forgetting function as the right fit:

$$f(t,u) = t^{0.10}u^{0.20}$$  \hspace{1cm} (Eq. 6)

Using equations 3 and 6 generates the following resultant function:

$$r(t,u) = 20t^{0.09} + u^{-0.05} - \left[ t^{0.10}u^{0.20} \right]$$  \hspace{1cm} (Eq. 7)

One of our goals is to be able to visualize the impact of intermittent forgetting on learning and productivity improvement. Equation 7, even at its simplest form, cannot be easily visualized due to the fact that part of it is a product of two exponent factors $t^{0.10}u^{0.20}$. To achieve that visualization, discrete event simulation using C++ programming language was used to compute the resultant $r(t,u)$ function. The numerical output from each cluster of simulation run replicates was used to generate a continuous graph for better visualization of the results. Since $r(t,u)$ is a bivariate function, the resulting continuous graph is a three dimensional graph with time ($0<t<2,000$) and production unit ($0<u<1,500$) represented on the two horizontal
axes and the resultant learning/forgetting curve \( r(t,u) \) is shown as a surface in the third dimension. Variance reduction techniques were used and statistical analysis of the simulation model was performed, but both are omitted for the purpose of this paper.

A single server queue was simulated to model the additional impact of the intermittent forgetting periods. The generated times between entity arrivals were distributed exponentially (number of arrivals per unit time following a Poisson probability distribution). The service time for the server was an exponentially distributed service. This made the queue an M/M/1 queue. When a queue formed in front of the server, forgetting began. Forgetting continued for as long as there were entities in the queue. When the queue was cleared, forgetting was terminated until a queue began to form again.

The simulation model was analyzed to determine an appropriate warm-up period for the generation of the queue times. Different queue parameters were used for this purpose, resulting in the queue reaching its steady state position at approximately 400 time units. Results also showed that the length of queues had high variability, a desirable property in our case since we want to study short as well as long periods of forgetting. At no point did the system appear to go into a non-stable state.

Based on the above results, the time between arriving entities to the queue was generated from an exponential distribution with an average of 1/5 of a time unit, truncated at 1/6 as a minimum and 1/4 as a maximum. We considered five different service levels for controlling the change in the average queue length or the forgetting period. The objective was to view varying numbers and lengths of forgetting periods by making runs using different degrees of service levels with the same average arrival rates. As the service input approached 5, the average queue length, and therefore the average life of the queue, approached infinity. These results are shown in Table 1 and in Figure 1.

<table>
<thead>
<tr>
<th>Average Service Input</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>4.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Queue Length</td>
<td>2.554</td>
<td>2.978</td>
<td>4.320</td>
<td>9.028</td>
<td>13.404</td>
</tr>
<tr>
<td>Average Queue Time (Forgetting Period)</td>
<td>6.700</td>
<td>10.411</td>
<td>12.880</td>
<td>75.628</td>
<td>145.600</td>
</tr>
</tbody>
</table>

Table 1: Queue analysis (average duration of the forgetting period)

![Figure 1: Average queue length versus average service input](image-url)
It is a fact that different people learn and forget at different paces. When modeling learning and forgetting for a group, it is therefore appropriate to include some smoothing to the model to reflect the overall group learning and forgetting particularly during a transition phase. For this purpose a three-period weighted moving average was used where:

\[ \alpha = 0.2, \] the relative contribution to the resultant from two steps earlier.

\[ \beta = 0.3, \] the relative contribution to the resultant from the previous step.

\[ \gamma = 0.5, \] the relative contribution to the resultant from the present value.

Where: \( \alpha + \beta + \gamma = 1.0. \)

RESULTS

Limitations

Like any other experimental results, these results are limited to what we set as parameters of the experiment. The learning curve and rate have been studied for nearly a hundred years and the results have been commonly accepted in industry. Understanding the impact of forgetting on production and productivity is much more challenging as forgetting interacts with the amount of learning and depends on elapsed time, units produced, and units not produced. Another level of complexity is the fact that we still cannot differentiate between forgetting, which is a permanent behavior, and lack of memory recall, which depends on the way our brain functions.

These are theoretical results based on a mathematical model of learning-forgetting interaction. The model is surely still far from being perfect as researchers in different fields have yet to have a better understanding of the working of the human brain and the interaction between learning and forgetting. These results should therefore be viewed as guidelines rather than definites.

These results provide a better understanding of the impact of forgetting on learning and productivity with the following understanding and limitations

- Learning is a continuous process. Even when interrupted, learning continues at different rates depending on how related is the present function to the previous function.

- Both learning and forgetting are a function of elapsed time and number of repetitive tasks. Elapsed time and number of repetitive tasks are not independent of each other. The model that we use (equation 7) reflects this lack of independency. Time is the primary factor in this study and the number of repetitive tasks is the complimentary factor.

- The start and the duration of the intermittent forgetting periods are modeled with an M/M/1 queue for this research. Longer queues represent longer forgetting periods. The length of the forgetting period is changed by changing the service rate of the queue.

Results

We are interested in having a visual representation of the combined effect of learning and forgetting. We are also interested in quantifying the impact of intermittent interruption on continuous learning. Using the mathematical model of equation 7, we plotted the resultant \( r(t,u) \) in the three base scenarios shown in Figure 2. Figure 2a shows the magnitude of the resultant when only learning is occurring. In this case there is no work interruption and therefore forgetting is completely ignored. Figure 2b shows the magnitude of the resultant when interruption or intermittent forgetting was introduced. In this case we can see the dips in learning as a result of the periodic introduction of forgetting. Fig 2c is a smoothened curve of the magnitude of the resultant which depicts better the organizational learning and forgetting as different people in an organization learn and
Fig. 2a. Resultant learning curve without forgetting

Fig. 2b. Resultant learning curve with intermittent forgetting

Fig. 2c. Resultant learning curve with intermittent forgetting and smoothing

Fig. 2. Typical representation of the resultant learning curve with and without forgetting and with smoothing.
forget at different rates. It should be noted here that our interest in these graphs is the portion after which learning levels, and therefore the rapid increase at the beginning of the curve is to be ignored.

Table 2 and figure 3 together show the final results of our study. In figure 3a, when the average service input is low (3.0), meaning short and infrequent periods of interruption, we can observe infrequent dips in learning and quick recovery to the previous level soon after the period of forgetting. As the average service input is increased to 3.5 and 4.0 (figures 3b and 3c), the dips in learning become more frequent as in figure 3b, or wider as in figure 3c. More frequent dips of course represent more frequent interruptions and therefore more frequent but shorter periods of forgetting, resulting in less forgetting during each period. Less frequent dips represent lower number of interruptions for the same total period of time, and therefore less frequent but longer periods of forgetting, resulting in more forgetting during each cycle. These two levels are considered to be “low forgetting” for the purpose of our study. When the average service input is increased to 4.5 and 4.8 (figures 3d and 3e), the dips in learning become infrequent but last for a long duration. These long dips represent long periods of interruption and therefore long periods of forgetting. These last two levels are considered to be “high forgetting” for the purpose of our study. It is noticed that for the long forgetting periods, the learning resultant levels off after the initial drop and continues to be level until the end of the forgetting period, i.e. until going back to the original work from which an interruption occurred. This is explained by the previously mentioned fact that learning during the interruption continues at a certain rate that is dependent on how related is the new work to the previous interrupted work. Some researchers even believe that learning accelerates when a task is interrupted by a different but related task (Schilling et al., 2003).

When the average service rate increases above 4.8, and as it approaches 5.0, the simulated queue tends to grow continuously. This is the case when the old task is interrupted by a new task for a period of time that exceeds our study period. This is considered to be “continuous forgetting” for the purpose of our study.

<table>
<thead>
<tr>
<th>Level of Forgetting</th>
<th>Forgetting (% of possible total)</th>
<th>Resultant Reduction (% of Learning loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>79</td>
<td>9</td>
</tr>
<tr>
<td>Continuous</td>
<td>100</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 2: Average forgetting and learning loss percentages

Table 2 above shows an important quantitative summary of the simulation runs. It compares the degree of forgetting and learning loss in the two-level categories that we previously described as low forgetting and high forgetting to the continuous forgetting case. These results show that applying a small effort to avoid being in the high forgetting range would result in avoiding a much bigger loss in learning: reducing interruptions by 21% would result in recovering around 50% of what would be lost in learning or process capability. It is therefore necessary for management to recognize that fact and manage the work interruption in a manner that would avoid significant loss in productivity. Most of the job related interruptions, like moving a person from performing a task to performing another, are under the control of management, and therefore management should implement a recall or a retraining program to avoid having any employee approach the twenty percent highest level of forgetting.
Fig. 3. Graphs showing the resultant of Equation 7 simulated at different levels of forgetting.

Fig. 3a. Resultant with average service input of 3.0
Fig. 3b. Resultant with average service input of 3.5
Fig. 3c. Resultant with average service input of 4.0
Fig. 3d. Resultant with average service input of 4.5
Fig. 3e. Resultant with average service input of 4.8
APPLICATIONS AND CONCLUSIONS

These results improve on the continuous effort to understand the relationship between learning, forgetting, and productivity improvement. Learning and forgetting curve analysis has and will continue to be used in businesses for diagnostic, planning, and implementation purposes. Using what is being learned from studying the learning-forgetting curve and its applications could therefore be a serious component of job design and compensation decisions.

Breaks or interruptions in learning clearly affect the levels reached in previous learning cycles and therefore management has the duty of managing these interruptions in a way that minimizes the impact of forgetting. Workers are being asked to do varied tasks as demand for mass customization has been continuously increasing. Moving a worker from one task to another creates an interruption in learning and therefore an opportunity to forget. When workers are performing a variety of tasks that are related or slightly different from each other, learning improves at a rate comparable to the forgetting rate, resulting in a minor change or even sometimes a positive impact on productivity. Schilling et al. (2003) have noted this phenomenon and our present simulation study of the learning-forgetting curve has confirmed that fact in both short forgetting periods as well as long forgetting periods. When the interrupting task is very different from the interrupted task, serious loss in learning might occur. Management should therefore apply an effort to shorten this type of interruption as much as possible.

Applying intermittent, short periods of forgetting, as was done in this study, can also be associated with many present jobs where workers are asked to operate in a rapidly changing work environment caused by the influx of new technology, processes, and products. Managers have long complained about the lack of productivity in project management because much of the technology and processes are changing from one project to another. Knowledge transfer from one project to another, or the learn-forget-learn cycle, provides managers with a challenging opportunity to manage loss of productivity due to project change.

Training has been commonly used to accelerate the learning rate and therefore to improve job performance. During long periods of interruption, training should also be used to minimize forgetting so that the performance level remains close to the same upon return to the interrupted task. This study and its results also allow training managers a better understanding of the need, frequency, and level of such training.

REFERENCES


**Appendix A: Power function model for labor productivity**

\[ T(1) = a \]

\[ \Phi = 0.90 \]

\[ \Phi = 0.80 \]

\[ T(s) = a s^{-m} = \text{time for unit } s \]

\[ a = \text{Time for unit 1} \]

\[ s = \text{Repetition unit number} \]

\[ m = - \log \Phi / \log 2 \]

\[ \Phi = \text{Learning rate} \]

\[ (1 - \Phi) = \text{progress ratio} \]

**Appendix B: Exponential learning model with a learning ceiling**

\[ y = k (1 - e^{-t/R}) \]

\[ (1 - e^{-t/R}) \]

\[ (e^{-t/R}) \]

\[ R = 0.85 \]

\[ R = 0.95 \]

\[ y = k (1 - e^{-t/R}) = \text{Performance} \]

\[ k = \text{Performance ceiling} \]

\[ t = \text{Elapsed time} \]

\[ R = \text{Learning rate} \]

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BREAKING WITH THE PAST: A CRITICAL THINKING CASE ANALYSIS

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ABSTRACT

This article contains a case, with supporting teaching materials, developed for an MBA course on critical thinking in a business context. The key topics of focus in this capstone case are leadership, change, corporate culture, and ethics. The situation described is a joining of two companies with very different histories and cultures. The merger is championed and directed by a newly hired leader, who asserts that it is necessitated by a changing environment. In answering whether this leader should have been hired, the student draws from a semester’s worth of readings and a structured approach to analyzing and writing. The structure is based on the critical thinking elements of Purpose, Question, Information, Assumptions, Points of View, Concepts, Implications, and Interpretation. Intentional ambiguities in the case permit either a yes or no answer to be supported, while requiring the student to make justifiable assumptions and identify concepts relevant to the circumstances.

INTRODUCTION

The case that follows was written as a comprehensive activity for our university’s Contemporary Business Perspectives course, which introduces MBA students to critical thinking in the context of numerous business-related topics. Ideally the course is taught by a team of two instructors from different disciplines, who can provide alternative viewpoints on complicated questions for which specific correct answers do not exist. The most prominent topics our sections of the course have addressed are leadership, change, corporate culture, and ethics. Breaking With the Past is fictional, because it would be impossible to find an actual recent business situation that touches in the needed way on all the topics. In completing their analysis students draw from readings that have been assigned and discussed throughout the semester prior to this capstone assignment. (Readings relevant to this case are provided in the reference list that follows the brief instructor notes.) We direct students to view themselves as consultants brought in to provide a decision maker with a report recommending a course of action on a difficult, controversial matter. The report will be the most useful tool the busy executive reads before announcing, and defending, the important decision in a board meeting or press conference. A challenging page limit on the submission forces the writer to be concise and selective, yet balanced.

Our assigned format for writing up the analysis is in keeping with the Elements and Standards “Wheel” shown on The Critical Thinking Community’s web site. This approach is especially well suited to answering and substantiating a yes/no question. The elements are a Purpose and Question to be addressed (given as part of the assignment); Information (what is known as fact, based on statements in the case) and Assumptions (what must be inferred when desired information is absent); Points of View (identification of parties whose viewpoints on the situation in question could be relevant); Concepts (explanation of ideas drawn from semester readings that provide theoretical bases for addressing the Question); Implications (positive and negative outcomes that would arise from either possible answer); and Interpretation (a recommended solution the student supports by threading together the five previous elements: the course of action that provides the best outcome for the party whose viewpoint is most relevant, in light of the concepts that guide the writer’s thinking and the events that are known or assumed, after careful thought, to have taken place).
ELEMENTS OF CRITICAL THINKING AND THE ASSIGNED QUESTION

The unstated Purpose in each of our Contemporary Business Perspectives cases is “to practice critical thinking.” The Question in Breaking With the Past is: “Should TopBilt have hired Jackson Griminger as its President?” The analysis should be based on careful consideration of Information, Assumptions, Points of View, Concepts, and Implications, which link together appropriately in a final Interpretation. Reading the case simulates the investigation a consultant would do in a real world situation, in which the activities would include talking to people, accessing documents, reviewing news accounts, and ultimately sifting through many irrelevant facts or comments. In reading the case, as in conducting a real world investigation, the student is likely to encounter dead ends, conflicting statements, useless information or inconsistencies, and events reported outside their chronological order. Thus the case is written in a way that prompts the analyst to evaluate, organize, synthesize, and, in general, think critically. The instructor assigning a case of this type might wish to provide the following guidance on critical thinking elements:

Information: Obtain it from the case. The situation being analyzed is by its nature controversial, so the presentation of information to guide the report reader should be balanced (depth vs. breadth, positive vs. negative, etc.). Do not waste limited space presenting facts that could not affect the decision. And be mindful that you can treat as factual no more than what the case tells you. If the case states that Bob left the building at 7 PM, then you can treat as a fact that Bob left the building at 7 PM. If the case states that Beth spoke of Bob’s having left the building at 7 PM, then you know only that Beth said it, not that it necessarily happened.

Assumptions: State them clearly, and give a reasoned justification for each. If the time of Bob’s departure is important to your analysis, you may have to make an assumption on whether Beth’s statement can be relied on, based on such factors as how well placed she would be to know and whether she might have reason to mislead. Analysts’ reputations for effectiveness are forged by the logic and common sense incorporated in the assumptions they make.

Points of View: List the parties whose points of view are relevant to the analysis, and be sure to tell why each listed point of view could be worth considering. But do not tell what each party’s point of view is. The most relevant party’s point of view is to be explained within the Interpretation section. Specifics of the points of view of parties ultimately deemed not to be the most germane play no role in the critical thinking analysis, so space limitations dictate that they be omitted.

Concepts: Base your discussion on the readings and class discussions from throughout the semester. Examples would be Level 5 Leader or Mercenary Organization. Be sure to define each concept you list, and briefly cite the readings in which you learned of these concepts. Reading and citing these sources simulates the process of seeking out and recognizing the input of experts.

Implications: List several positive and negative outcomes for both “yes” and “no” answers. Strive for balance, and be careful to avoid internal inconsistency. For example, if “profits increase” is listed as a positive implication of merging two companies, “profits increase” cannot, logically, be a positive implication of not merging the companies. (If profits are expected to increase either way, then profitability is irrelevant to the decision and should not be mentioned in the limited space available.)

Interpretation: Integrate the prior elements (the narrative should contain links to the most relevant aspects of the earlier sections), and answer the question. No new information, assumptions, concepts, etc. should be introduced in the Interpretation. The reader should be provided with all relevant facts, for example, in the Information section – someone struggling with a difficult, controversial decision does not want to learn surprising new facts at this late stage of the presentation.

For this case we specify a report of seven-page maximum length, double spaced, with Times New Roman 12-point font. Students are reminded that the situation is controversial, so they should strive to strike a good depth/breadth balance in the sections leading up to the Interpretation. The writer gains the report reader’s confidence from the first sentence by using the limited space to present what is most important and relevant in the Information and other elemental sections, so that the reader/decision maker would be especially well prepared to answer meaningful questions from parties who might oppose the decision.
THE CASE

A Major Announcement – And Soon Another

TopBilt, a prominent but struggling Oregon-based producer of home building and repair products, announced the hiring of Jackson Griminger as its new President in March of 2013.1 As President, he also would serve on the board of directors. He replaced Victor Weston, nephew of the late George Weston, founder of tradition-laden TopBilt. Victor remained on the board, taking the place of George’s 97-year old widow. Joining Griminger and Victor Weston on the ten-person board were George Weston’s daughter Amanda Weston Brooks, a jovial socialite who chaired the board, often bringing her dachshund to meetings; her husband, retired travel agent David Brooks; and Victor’s brother Jonathan Weston, a college literature professor. Other board members, all close Weston allies, included family dentist Denise Chen, young attorney Lisa Shifeling, and Oregon banker Ronald Stiles, whose parents were TopBilt retirees with several hundred shares of stock.

At that time the Weston heirs jointly held a 48% ownership stake. While this minority holding technically did not allow the family to control the board and its agenda, their large block far exceeded the holdings of any other individual or identified group. Allied parties, including small investors among workers and retirees, held another 13%, giving a broadly-defined “insider” group unquestioned power to elect board members and determine company policies. This power was seen in Victor Weston’s having run the company for thirty years, until he chose to retire. Yet Victor and others in the family had not opposed bringing in an outsider as President. Their support for “new blood” reflected, at least to some extent, the fact that no younger Westons wanted to manage TopBilt.

The Westons and other shareholders also were unhappy with an unstable recent revenue stream amid rising costs. They liked the idea of a new leader at TopBilt’s helm who could continue George Weston’s vision while applying state-of-the-art management. The board strongly supported hiring the 59-year old Griminger, who had spent eight years as President of Craftco Millworks after moving up through the ranks at Craftco, a building products maker somewhat larger than TopBilt. They were especially impressed by Griminger’s reputation for identifying and nurturing young managerial talent. Griminger, who had been passed over when Craftco’s board brought in an outsider to replace a retiring Chairman and Chief Executive Officer in December 2012,2 jumped at the chance to take the top operating spot at TopBilt, with its popular products and interesting heritage. The University of Washington forestry and business graduate seemed to fit quickly into TopBilt’s way of doing business. His informal style played well as he visited facilities, getting to know even many production workers on a first-name basis.

While a non-Weston running TopBilt for the first time in company history was newsworthy, the big news came in July of 2013,3 when TopBilt announced it would merge with Winnipeg-based Northern Industries, a building products retailer. The combined entity was expected to be a major North American player in making and distributing construction and home repair products. The merger surprised many both inside and outside the construction products industry. Puzzling to some was the plan to continue calling the merged company TopBilt, operating from Portland, even though Northern had higher asset, annual sales revenue, and net income figures. The reason cited was TopBilt’s more recognizable name and image in the dominant U.S. market. The timing also raised questions. While TopBilt had experienced recent problems, and some Wall Street analysts believed the company too weak to survive the long term without serious changes, many who followed the building products industry felt a new boss should have waited longer before seeking merger partners. However, one small group of analysts and investors who were especially knowledgeable regarding TopBilt’s operations praised Griminger for “taking the bull by the horns.”

Combining Two Distinct Cultures

TopBilt was founded in 1934 when George Weston, who grew up around Oregon’s lumber camps, purchased a small logging and sawmill operation from the heirs of a man he had worked for, so area lumbermen would not lose their livelihoods. Prior to World War II the company was privately owned, with Weston family members controlling all ownership shares after incorporation occurred in 1941. Some shares were given to a loyal employee upon his return from Marine Corps service in 1947. Stock was first sold to the public in 1948, when the postwar home building boom gave TopBilt tremendous growth opportunities, but also an immense need for money from new investors. Over the years George, assisted by younger brother Ben, added new product lines, and the firm ultimately became a diversified construction material producer. But despite its growth, TopBilt always tried to operate according to George Weston’s belief that quality products were best assured by giving workers good training, generous pay, and a solid retirement plan; and by striving to keep them employed even during economic downturns.

During the negotiations, Griminger spent much time with Northern CEO Preston Hayes, who had directed sales at Craftco when Griminger was a young executive. In presenting the merger possibility to TopBilt’s board,
Griminger praised the 73-year old Hayes as a role model and mentor early in his career. Yet he was just as effusive in praising Northern’s 38-year old President, Cole McDermott, cited by Hayes as a bold and gifted manager whose talents had been a major contributor to the company’s recent successes. Hayes had expressed amazement at McDermott’s ability to leverage the retailer’s size in negotiating favorable terms from suppliers. Northern Industries, with its strong balance sheet and growing income, had made its corporate mark dotting the continent with Northern Home Center stores, catering to both professional builders and do-it-yourselfers. The company had come into existence in 1994, when a group of venture capitalists foreclosed on five warehouses of inventory that served as collateral on loans they had extended to a building products maker that went bankrupt. The initial store was expected to remain open only until that inventory was sold, but in the process of selling it the group saw additional opportunities that gradually led to their opening a sizable chain of permanent outlets.

Northern shares were to be exchanged for a larger number of newly issued TopBilt Corporation common shares. These “friendly” merger terms were enthusiastically supported by Northern’s board of directors, and by the Weston family and TopBilt’s board. But because Northern was the larger organization, it was clear the merger would have a profound impact on boardroom dynamics. The Weston family, long-term employees, and others closely connected with the Westons and the old TopBilt would hold just under 20% of the post-merger shares, far less control than the combined group had enjoyed before the merger. With their reduced voting power, the Westons and their allies knew they would have little direct board representation after the next yearly election, to be held in early December 2013. Although the terms called for Northern’s board to disband after the merger was completed, and although TopBilt’s corporate bylaws called for directors to be elected individually, with cumulative voting to promote minority representation, there was little reason to think the new ownership base would value the company traditions enough to continue electing numerous Westons and aligned individuals to directorships.

The news had not taken people inside TopBilt completely by surprise; for fifteen years employees heard talk of a possible merger. And among companies whose names had surfaced as possible partners, only Northern seemed to offer any chance for TopBilt to continue with its identity intact, and without drastic changes in corporate structure. In fact, when the business press had mentioned possible mergers, it typically had predicted TopBilt would be acquired by a larger building products maker. TopBilt’s board and others in the Weston family therefore welcomed Griminger’s statement that merging with Northern might be the only way for TopBilt to survive with its name and business units intact, and for its tradition of top quality products and respect for workers to continue. Griminger explained that the combined company could benefit from economies of scale and scope, especially in meeting transportation and promotion costs, but because the combination was vertical (supplier and customer) rather than horizontal (joining previous competitors) he did not see much immediate reason to close facilities or cut jobs.

Those assurances prompted the Westons and others on the board to support Griminger’s efforts enthusiastically. They were pleased that TopBilt had not been merged with a competing building products company, such as Kilnwood Corporation or High Peak Products, both of which had received negative publicity for frequent layoffs and terminated pension plans. When Victor Weston stated, at the first board meeting following the merger announcement, that having Kilnwood or High Peak take over TopBilt would have caused “Uncle George and my dad to spin in their graves,” other board members applauded. Amanda Brooks tearfully told Griminger, “I feared TopBilt would die, but thanks to you it can live on, the way my father would have wanted.” Still, Griminger knew it would be difficult merging two companies embodying such different cultures: TopBilt, with its history of cooperation and personal relationships, and Northern, whose briefer existence focused on bottom-line efficiency.

Hayes’s wish to retire had opened the door for Griminger to assume the newly created role of Chairman and CEO of TopBilt, with McDermott becoming President of the combined company. After merger terms were agreed to Griminger surprised many by, instead of giving the task to consultants, personally coordinating Canadian and U.S. government regulatory approval, a process that would keep him largely away from the headquarters for a few months. While Griminger shuttled between Washington and Ottawa, McDermott spent most days in Portland studying the operation. Griminger told Jonathan Weston that staying away, while instructing TopBilt executives to extend every courtesy to McDermott’s team, would be important steps in bringing the organizations together, and in helping the energetic Stanford MBA graduate make crucial decisions and staff key positions in the ensuing period.

Questions Surface

With regulatory approval secured in October 2013, Griminger asked McDermott to review relevant issues and draft a report for TopBilt’s board, stating that he wanted to build McDermott’s credibility as President of the expanded TopBilt operation. (TopBilt insiders had complained that McDermott had spent his entire career in retailing, and knew little about problems in a manufacturing organization.) After finishing the report, McDermott invited Griminger to Winnipeg, where he wanted to present his findings first to Northern’s outgoing board. Griminger told Victor Weston he thought it would be more appropriate to report first to the continuing TopBilt board
members, but did not want to second-guess McDermott on a minor matter while encouraging him to gain visibility in the new, larger, more diversified company. Griminger agreed to fly to Winnipeg for a November 15, 2013 meeting.

Early on November 14, Griminger settled in to review some documents before leaving for Winnipeg. He was agitated to hear a knock on the door, since his infamous “Don’t Even Think About It” grizzly bear cartoon sign was hanging over the knob. But anyone brave enough to ignore the warning surely was in dire need of some of his time. When he offered an unenthusiastic “come in,” Jeanine Rescho cautiously opened the door. “Just me,” she said. Rescho had been TopBilt’s Vice President of Marketing for seven years. The rural carpenter’s daughter had learned the building materials business as a sales representative and district sales manager for High Peak Products after completing an MBA at North Carolina State. The straight-talking 42-year old executive quickly had become one of Griminger’s most trusted lieutenants after he arrived from Craftco. Rescho also was the TopBilt manager seen as best connected with the company’s informal information network.

“Can it wait a few days?” he asked. “No,” she said, “gotta talk before you go. The rumor mill is out of control; everybody has the hell scared out of them. You don’t know what it felt like those weeks you were gone, and Cole McDermott’s KGB was here. They left no stone unturned nosing into everything we do. None of us had ever felt so intimidated.” Griminger stated that he had wanted McDermott and his staff to be in Portland to learn about TopBilt’s operations, and find ways to integrate TopBilt product lines into Northern’s distribution channels. “Look,” Griminger told Rescho, “Cole just likes to be thorough. He said he found some interesting synergies, and was impressed by the potential he saw. Why are people freaked?” “It was their attitude, and the things they said,” she replied. “We do it cheaper, that can be outsourced to more efficient overseas suppliers, our CIO could do wonders here, your HR boss needs a backbone, why offer pensions when nobody else does. How should we react?”

Griminger responded that such statements are to be expected when two companies merge. “It’s human nature,” he reassured. “It’s bravado and posturing and theorizing and wishful thinking. And it’s ignorance about the process, but that’s okay. We want fresh ideas; that’s one benefit of a merger. Changes will come, but they’ll come slowly. We’ll eliminate duplicated effort; that’s good since costs have been rising. With luck – maybe a lot – we can use attrition and retraining, and no jobs will be lost. But even if there are cutbacks, they won’t be huge. And the alternative to merging might have been closing facilities. Everyone has to realize that.” Rescho agreed that changes had been expected, but said McDermott’s team was unnecessarily aloof and calculating about everything they did.

“No one knew what to expect, and then the initial talk about Northern got our hopes up, maybe now we’re just riding the yo-yo back down again.” Griminger flew to Winnipeg that evening. The following day’s meeting, featuring McDermott’s report, was largely uneventful, although Griminger could not help but feel that the Northern insiders harbored a condescending view of their smaller but better known merger partner. He later told Ronald Stiles that he was not sure whether his feelings had been justified, or if Rescho’s statements had clouded his thinking.

The merged company began making slow changes under the direction of Griminger, who sought advice from Victor Weston and key production managers, all of whom remained from the old TopBilt organization. (The only initial management change was in the HR office, where vice president Roger Bushman took early retirement, telling colleagues he would rather leave than to have to report to McDermott; the old Northern HR chief Yvonne Price took his place.) Much of the early change involved finding economies in transportation. For example, trucks bearing Northern’s name were repainted with TopBilt’s logo, and the most efficient routes for delivering to Northern Home Center stores and other retailers were identified. The ten Oregon facilities also began adopting better information management techniques, with help from the Winnipeg technical staff. Rescho even found herself complimenting the work of Rhonda Owens, a personable information technology officer who long had worked for McDermott. The improved reporting capability showed increased productivity at some production plants, and a walk through any part of the TopBilt operation suggested reasonably high worker morale.

Difficult Choices

The December 13, 2013 annual shareholder meeting brought the election of new directors. Because former Northern stockholders held such a large proportion of the combined firm’s shares, the Westons and their allies adopted the strategy of concentrating their power, under the cumulative voting arrangement, toward electing two members to the new board. They chose Victor Weston and Ronald Stiles to receive their votes, and the two were elected. The remainder of the new board consisted of Griminger, McDermott, and six major shareholders who had served on Northern’s board before the merger. After elections were completed, with Griminger chosen Chairman of the Board, and new business was being discussed, a proposal was made to increase TopBilt board members’ compensation from $5,000 to $60,000 annually. Following a heated debate, the measure passed 7 – 3. Weston insisted he would give his increase to local charities.

Then board member Jane Scribner, one of the venture capitalists who had organized Northern Industries, asked to speak. “A majority of the new board have met informally over recent months to discuss TopBilt’s future.
Cost saving steps taken to date are wholly inadequate. We have spoken, as concerned shareholders, with Mr. McDermott, who assures us that more dramatic measures will be taken shortly. The shareholders we represent deserve nothing less. The cost control history on TopBilt’s production side is one of malfeasance; those who have been in charge should be embarrassed.” Others from the former Northern board voiced agreement. Griminger later told Rescho it had felt like getting punched in the stomach. Weston was unable to sleep well for days thereafter, and was hospitalized briefly for symptoms his physician attributed to stress.

A memo dated December 27, 2013 was sent, by McDermott, to every TopBilt employee. It showed a new corporate headquarters address in Winnipeg (Griminger assured a number of employees that he would maintain an office in Portland, as well). Most members of the new board said they wanted to relocate primary administrative functions to Winnipeg so managers would be closer to the majority of the directors. The memo informed all personnel of upcoming changes in numerous policies. First, the wood finishing products plant near Salem, plywood factory near Corvallis, and door hardware operation at the main Portland facility would close six weeks from the memo’s date. All workers at those facilities were to be terminated. Then, there was to be a considerable workforce reduction across the seven remaining production plants. No one terminated could expect to be re-hired. Modest severance packages were to be provided.

McDermott had discussed this potential action with Griminger on several occasions in October and November before sending the memo, but Griminger kept asking to see other possible plans, leaving it to McDermott to move ahead – which he did, gaining approval from six other board members before announcing the severe cutbacks. Griminger initially expressed anger about being ignored in a decision of such magnitude, but also said he knew something had to be done – and said he was sure a seven-member board majority ultimately would have supported McDermott’s plan, with or without Griminger’s concurrence. Products historically made at the closed facilities would be replaced by outsourcing, or other brands of products simply could be purchased to be resold at Northern Home Centers. No retail jobs were to be cut. Salespeople were economical because they received small base salaries but were paid largely on commission, the memo stated, while stockers were needed to service continued steady sales in stores.

The memo also announced that TopBilt’s pension plan would be discontinued. Each participant would receive a lump-sum payout, based on contribution years and salary level. Financial planners would be available to advise participants on retirement saving options, since the firm no longer would support retirement plans of any type. The memo asserted that this move did not change existing policy, but merely unified benefit arrangements across the company, since no retirement program was provided to Northern Home Center store workers. In addition, performance bonuses would be eliminated except for top management. Higher monthly premiums and co-pays on health insurance also would be imposed for workers and retirees alike. The memo acknowledged that government-provided health care was accompanied by higher corporate taxes in Canada, but stated it still was necessary to bring spiraling U.S. employee benefit costs into line. The memo conceded that these changes would create hardship for some workers, but reminded that competing firms had resorted to similar austerity moves to remain viable.

McDermott knew that those who lost their jobs would be livid, and he expected to hear criticism from other quarters as well, especially because the layoffs came on such short notice. But he was unprepared for the virulent anti-company sentiments expressed over ensuing weeks in editorial letters, and especially in the TopBilked web log created by some former workers. Writers called for boycotts of Northern Home Center stores and TopBilt products. Sales had not yet been negatively affected, but employee morale was observed to be down, and the entire board saw reason to be worried.

Communicating Harsh Realities

One day in February, while he was in Oregon, McDermott decided to drop in at the lumber mill near Portland. He hoped to get a feel for workers’ current thinking, and perhaps do some damage control, expecting a reasonably friendly reception since no jobs had been cut at that modern facility. But he was in for a rude awakening. As he entered the cafeteria to chat with a group taking a coffee break, a few who recognized him got up from the large table and left. “Come out here to shut us down?” a bearded man who remained seated asked. “No, just heard the coffee is worth the trip,” McDermott replied in an awkward attempt at humor, to which no one reacted. He then offered, “I want you to know that TopBilt’s future looks bright.” “Really?” the bearded man asked, his voice quavering. “People’s lives have been turned upside down. They sacrificed over the years for the company, and now they have nothing. What are they supposed to do? How do any of us plan for our futures, our families?” McDermott stated that no more layoffs were expected in the foreseeable future. He said he knew that some who had been laid off were friends and relatives of people at the table, and that the layoffs were horrible for many, but they were necessary. “Holding down spending keeps the remaining jobs in place. It’s a competitive world; we have to cut when we aren’t cost effective.”
A middle aged woman asked, “So Mike Shifeling wasn’t cost effective? How do you justify what happened to him?” McDermott had to apologize; “I’m not sure who that is.” There was whispering around the table; a few laughed uncomfortably. The woman proceeded to explain some company history to a bewildered McDermott. Mike had managed the closed plywood facility. He was the son of Tom Shifeling, a legend within the company. Tom was hired as a teenager by George Weston in TopBilt’s early days. During a time of local labor unrest the seventeen year old Tom worked 15-hour days, seven days a week, for more than four months riding in trucks to help George and Ben deliver products to contractor supply yards. If not for those heroic efforts – working extremely long and difficult hours, armed with pistols in the face of threats to the men’s lives – the growing young firm would have gone out of business.

Tom became the first non-Weston to own stock in the company, and George and Tom hunted and fished together regularly for many decades, with young Mike eventually joining them on their trips. Both Shifelings remained close to the Westons, especially to George, who had no sons, until his death in 1988. In his will, George left his lakeside cabin and valuable fishing equipment jointly to Tom and Mike. Even though, by his own choice, he was never a high-level manager, Tom was a longtime TopBilt fixture as a plant foreman; he remained a goodwill ambassador until his own death in 2011. Mike joined TopBilt right out of high school in 1974. He eventually managed several company plants, and mentored many who worked in the wood products operations. He was known as a demanding boss with a kind nature, who developed innovative inventory management techniques and new uses for chip and particle board, which created jobs and allowed TopBilt to profit from by-products that formerly had been thrown away. Mike’s daughter Lisa became a board protégé of Victor Weston, the son of her grandfather’s old friend Ben. So how, the woman asked, could McDermott defend Mike Shifeling’s treatment? “He hired a lot of us, made sure our kids had summer jobs, and he was like a grandson to George Weston,” the woman explained. “If you can throw him out on the street and cry cost effective, how thin a thread are the rest of us hanging from?” McDermott said he was sorry if his words seemed insensitive, but all steps that had been taken were needed for TopBilt’s survival.

Why, another man asked, were workers not given warnings, or the chance to accept pay cuts or other “givebacks” instead of losing their jobs? “We used to share the wealth in good times, and work together when things got tough. You never said what was needed to keep people working, gave no choices. Let loyal people go in a cold-blooded way. The Westons never would have treated us like that … and Jack Griminger wouldn’t either, if he had his say.” McDermott explained that all top management and board members had been involved in the decision process, but the man offered no reply, and as he stood up from the table others rose to follow. “Please,” McDermott implored; “we have to communicate to build trust.” An older woman in a head scarf stared McDermott in the eye and said, “We’d better get back to our jobs while we still have them.” The entire group then walked out. McDermott made no further plant visits.

Change for the Better – or Merely Change?

Today TopBilt seems like a very different company. Some current and former workers say George Weston’s ideal of keeping people working is gone. Almost 17% of the production work force has been laid off in an economic downturn that has been especially constraining for construction products. But shuttering the wood finishing products plant, which made TopBilt paints and stains, had long been discussed even apart from merger talks, because the aged plant was inefficient to operate, and TopBilt was not thought to be competitive in that product line. And the door hardware operation was being phased out anyway, as the firm found it difficult to hire skilled workers and had begun selling outsourced knobs, locks, and hinges under TopBilt’s label. But many workers had assumed they would receive new assignments. Plus few had expected severe cutbacks at the drywall facility, or the total closing of the plywood factory. It was seen as a bitter irony that one of those terminated was a machine technician who had argued vocally the day before McDermott’s memos arrived against trying to form a union. “We work for TopBilt; they’ll take care of us,” she had said.

Not only production workers have been affected; all five former TopBilt vice presidents gradually have been replaced with their counterparts at former Northern Industries. One accepted a lower position in the combined company, and two others were simply terminated. Even Rescho ultimately was given the choice of moving to a sales position or leaving. But shortly after a long and tense call between McDermott and Griminger ended, Yvonne Price phoned to offer Rescho the new Portland-based job of New Products Coordinator, with no reduction in pay from her vice president salary. Victor Weston resigned from the board for what he cited as health reasons, and after a brief discussion the rest of the board unanimously appointed Lisa Shifeling to fill the unexpired term. Both Griminger and McDermott recently were awarded large performance bonuses, despite Griminger’s sometimes strained relationship with the board. He has argued with the former Northern board members, saying they misrepresented their intentions during merger negotiations, while they allege he understated the problems at TopBilt production plants – an
accusation he has not denied. But both sides agree that the merger has benefited the company financially, saved some jobs, and added to consumers’ choices through the development of new products and competitive prices.

Each remaining production plant has enjoyed significant productivity gains, and industry observers credit the merger with keeping TopBilt sales reasonably stable in a difficult environment. In fact, with construction activity rebounding they expect the coming year’s income to exceed the total combined earnings of TopBilt and Northern for any earlier period, with record revenues and materially reduced costs relative to other recent years. The stock has risen in price during recent months by about the same percentage that the stock market has risen overall, and the quarterly dividend suspended in 2011\(^{13}\) has been reinstated. Many observers say the cost savings brought about through the plant closings and layoffs are of a type that can be realized in future periods, as well. They think investors are playing “wait and see,” and that the stock may be poised for a sizable price increase. These analysts view the closings and cutbacks as having been inevitable; they say original TopBilt stockholders, some remaining workers (due to better training for higher paying jobs), and even those terminated (with severance benefits more generous than initially had been anticipated, which many argue could not have been offered by the old TopBilt) are better off than they would have been without the merger. But others express concern that the changes have been too drastic and rapid, and ask how much worse things could have been had old TopBilt undertaken its own austerity measures. And some longtime customers have voiced recent concerns over product quality. In addition, some production and retail workers have spoken with labor organizers about forming a union – a move that if enacted would, in some knowledgeable analysts’ eyes, eat away much of the cost savings realized through the layoffs and benefit cuts.

**Date References**

1. Thirteen months prior to date when you hand the case out to the class
2. Sixteen months prior to date when you hand the case out to the class
3. Nine months prior to date when you hand the case out to the class
4. Approximately 20 years prior to date when you hand the case out to the class
5. Four months prior to date when you hand the case out to the class
6. Six months prior to date when you hand the case out to the class
7. Day approximately five months prior to date when you hand the case out to the class
8. One day before date reference 7
9. Day approximately four months prior to date when you hand the case out to the class
10. Two weeks after date reference 9
11. Six and five months prior to date when you hand the case out to the class
12. Two months prior to date when you hand the case out to the class
13. Approximately 3 years prior to date when you hand the case out to the class

**INSTRUCTOR NOTES**

The ultimate question the case addresses is: should TopBilt have hired Jackson Griminger? Much of the student’s analysis should relate to the joining of two firms with such different cultures and distinct origins. But then again, are they so different? TopBilt was formed by people trying to save their jobs, while Northern originated through the need to generate cash from defaulted loans. Yet both were born of necessity, under challenging business conditions.

There seem to be at least three assumption-backed general stories that could be inferred about Griminger’s leadership and ethics (with many possible variations, and other stories that could be inferred as well):

**Griminger the Indecisive:** was passed over for CEO spot at Craftco because he could not make the tough calls when they had to be made. Was never quite sure what he was getting TopBilt into with the Northern merger. Griminger’s indecisiveness compelled McDermott, who knew only the retail side, to take ill-advised drastic steps on the production side to satisfy the board without the benefit of Griminger’s input. In fact, Griminger was happy to handle regulatory matters that could have been delegated/hired out so that he would not have to make difficult operating decisions during the transition.

**Griminger the Politician:** wanted to end his career with a CEO position, and would do whatever it took to get there. Saw TopBilt, with its clubby, unprofessional board, as putty in his hands. Told the TopBilt board he would do everything possible to minimize changes in the culture, while telling Northern’s board that he would...
give their trusted insider, McDermott, free rein to implement whatever changes they wanted to see (and failing to fully disclose TopBilt’s problems). Then let McDermott take the blame for controversies that arose, while accepting credit (and a bonus) for favorable financial outcomes.

Griminger the Nurturer: saw meeting Westons’ dual financial/tradition concerns as a solemn trust, thought Northern merger might support both. Felt McDermott was exceptionally gifted and could be an excellent leader over the long term, but first would need to learn some lessons the hard way. Gave him unfettered access to information, then forced him to make decisions, take action, accept consequences. Finally exerted authority when things had gone too far, preventing McDermott from diminishing Rescho’s position and convincing old Northern board members that TopBilt’s traditions did have merit (leading to unanimous support for Lisa Shifeling as a board member).

Any of these philosophies (and possibly others), and either answer (yes or no), could be consistent with a strong analysis, if the writer tells a coherent, well-organized story supported by appropriate assumptions. Issues that might call for assumptions to be made include:

- Why Griminger was passed over for CEO spot at Craftco: bad luck/timing, or seen as bad manager/leader
- Which concern the Weston group placed more importance on: keeping traditions alive, or earning good returns
- Why no younger Westons wanted to manage the business: not interested, or knew there were severe problems
- Which group of Wall Street analysts had the more correct take: large group that opposed quick merger, or small but more knowledgeable group that supported it
- Whether McDermott was President of combined company because Griminger truly wanted him (based on his own observations and Hayes’s recommendation), or despite Griminger’s reservations (because Northern investors insisted on having “their person” running day to day operations as part of the merger deal)
- Whether McDermott was heartless and concerned only for his own advancement, or was under pressure from powerful Northern investors and getting no help from Griminger
- Why McDermott presented his report on the merger first to the defunct Northern board rather than the combined organization’s official ongoing board
- Why board pay rose twelvefold after Northern group took control: cold-hearted selfish interests, or concern that without reasonable compensation members would pay more attention to their dentists and dogs than to important board duties in a more complex company
- Whether Griminger’s was the third vote against increasing board pay, and if so why (support for TopBilt traditions, show of defiance toward Northern insiders, or a costless ploy to look good for Westons and their allies, including production workers)
- Why severance packages ultimately were better than initially had been expected (possible Griminger influence?)
- Why Lisa Shifeling was unanimously selected to fill Victor Weston’s remaining board term (had Griminger finally convinced old Northern people of benefits of adhering to some TopBilt traditions, along with a substantive way to soothe wounds with Weston/Shifeling allies – vs. a meaningless “sure, why not” since the Northern group could not be outvoted anyway – or could savvy lawyer Lisa have been perceived as a Northerner in TopBilt clothing?)

Since the writer can draw on concepts from the entire semester, the grade benefits from citing a larger number of concepts and using them meaningfully in the Concepts and Interpretation sections.

The authors thank Joyce Ostrosky and the anonymous reviewers for their helpful comments.

REFERENCES


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THE BROWNIE BAKER: A RECIPE FOR CONTINUED GROWTH

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ABSTRACT
The Brownie Baker, owned by Dennis Perkins, makes specialty baked goods including brownies, muffins, Danishes, cookies, cakes, donuts, and Hispanic pastries. Located in Fresno, California, the bakery distributes its products across the United States. Under Perkin’s leadership the bakery has grown and prospered. This case details the operations strategies and management techniques that have led to this success.

COMPANY BACKGROUND
When Dennis Perkins purchased The Brownie Baker in 1990, it was a small bakery in Fresno, California with a handful of employees and annual sales of $180,000 (Houts, 2009). Business grew, hitting 10 million dollars in sales in 2007. Then Perkins navigated successfully through leaner recessionary years and slightly lower sales, while some of his competitors were squeezed out of business by rising commodity prices. Today, sales are back up over the ten million mark and growing. The outlook is strong, and as a result the Brownie Baker anticipates adding further to its current workforce of 67 employees.

Perkins’ down-to-earth, receptive management style, a well-designed strategy, an innovative product mix, productivity improvements, careful inventory and supply chain management, and strategic human resource decisions have been key ingredients in the company’s successful growth. Perkins himself was named the Small Business Administration’s Central California Business Person of the Year in 1999, and The Brownie Baker was awarded the Small Business Administration’s Western Region Choice Award in 2004 (Houts 2009). Recently, new leadership also helped bolster sales. In 2011, after retiring from his position as Vice President/General Manager at Pepsi, Jeff Marchant became the Brownie Baker’s new president, a role previously held by Perkins. Marchant brought insights and ideas grounded in his 30 years of experience in the food/beverage industry. Other top management hires with years of industry experience further strengthened the leadership team and led to new process improvements. Employee loyalty is high among workers on the bakery floor, and they have responded to changes favorably, increasing their efficiency and flexibility.

MISSION
When asked to describe his essential business philosophy, Perkins responds that he strives “to supply the consumer with fresh, high quality packaged bakery products, delivered on time, with friendly and accommodating customer service, exceeding all expectations.” (Houts, 2009 at 41). The Brownie Baker produces gourmet specialty baked goods, using only the highest quality ingredients, such as local California raisins, gourmet chocolate, fresh eggs, C & H sugar, General Mills flour, and real fruit. The ingredients are more expensive than those used by some competitors, but Perkins is targeting customers who want higher quality baked goods (Houts, 2009).

PRICING AND DISTRIBUTION STRATEGY
Pricing on a given item can vary greatly depending on the distribution point. For instance, the price for a baked item can range from $1 at a grocery store to as much as $3.49 in an airport convenience store. Historically, the Brownie Baker focused on the “grab and go” market. Distribution points included gas stations and convenience stores, airports, colleges and universities, ski resorts, golf clubs, and national parks. Perkins describes a key demographic segment of his market as “Bubba,” the big guy at the truck stop. In fact, Perkins’ mantra is “Bubba is our friend” (Houts, 2009 at 42). Each Brownie Baker product is individually packaged with the design imprinted directly on the plastic film, an important part of the bakery’s “grab and go” strategy for several reasons. In addition to convenience, individual packaging provides a longer shelf life and freshness is enhanced. Customers like the quality image of an
item that is individually packaged and neatly displayed. Convenience stores like the way high quality Brownie Baker products give their coffee bars a more upscale feel to better compete with places like Starbucks. Unlike some competitors, the Brownie Baker chooses not to sell unwrapped products in self-service, open display cases. Although open display cases can be less expensive, yielding higher margins, there tends to be more waste as unsold leftovers must be thrown away. Perkins also does not package products in multi-unit, clamshell packages for places like Costco and Food-4-Less, because selling in bulk is more price sensitive and has smaller margins than packaging individually for resale.

Recently, Perkins decided to diversify distribution. Rather than focusing exclusively on “grab and go” convenience distribution points, partnerships are now in place with local grocers such as Save Mart, Food-4-Less, and Food Maxx. The new plan also includes Lucky’s in the San Francisco Bay area and several independent grocers throughout California. Products are placed in grocery stores on freestanding displays, either nearby the milk refrigerators or up front near the cash registers. Volatile gas prices and reduced discretionary income during the recession meant customers did not buy as many convenience store snack items. The Brownie Baker views the new grocery distribution points as more stable despite changes in the economy at large. Begun in March of 2013, this segment already accounts for about ten percent of the bakery’s sales volume, and Perkins anticipates it will account for 20 percent of volume after one full year.

PRODUCT MIX AND NEW PRODUCT DEVELOPMENT

When Perkins acquired The Brownie Baker, it sold a variety of brownie flavors. Over time, new items were added, including muffins, cakes, cookies, Danishes, and Hispanic pastries. The newest addition is tiny donuts in three flavors: chocolate covered, powered sugar, and crumb. Double chocolate muffins are the bakery’s most popular product. Based on that success, Perkins recently introduced double chocolate as a new cake flavor too.

The Brownie Baker distributes its products throughout the United States. In most markets, muffins are the top seller. Cookies, cakes and Danishes are next in popularity, performing about equally well. Overall, the product line does well across the United States, but flavor preferences do vary by market. Perkins has found pockets of Hispanic pastry buyers in markets across the United States.

In 2012 the Hispanic pastry line underwent rebranding after considerable market research to try to better reach the Hispanic consumer. Colors, designs, and names were chosen to have a particular appeal for this audience. Even after the rebranding, however, Perkins finds that when Hispanics want a Hispanic pastry, they buy a brand that comes from Mexico. In addition, Hispanic grocers, such as Vallarta in Fresno, prefer to stock the Brownie Baker’s “American” products, such as muffins, while carrying the “Bimbo” brand, produced in Mexico, for Hispanic pastries. The Brownie Baker also had quality inconsistencies with a supplier to whom the production of Hispanic pastries was outsourced, and in some instances Perkins’ products were competing with that same company’s brand in convenience store outlets. A new supplier was found, and product quality is now more consistent. Despite these challenges, the bakery still offers three core Hispanic pastries in its “Pan Dulce” line (Panquecitos, Quesadillas, and Concha) that sell reasonably well in convenience store outlets. The other four less profitable pastries were dropped.

In generating ideas for new products, Perkins listens to feedback from customers, buyers, and store owners. He watches the competition closely and also looks at trade magazines and trend books. The suppliers of the flavors, fruits, and mixes help create the recipes that will be used for new products (Houts, 2009).

One interesting product was introduced about 15 years ago. While scanning the market for ideas, Perkins noticed Carol’s Cookies, based in Long Beach, California. While some people suggested that Perkins should just copy Carol’s product, his response was, “I don’t like to operate like that” (Houts, 2009 at 43). Instead, he struck a ten-year deal with her to acquire production rights, accounts lists, and equipment and to give Carol a percent of all sales. Initially, when The Brownie Baker took over production of the cookies, they were still sold with the Carol’s Cookies graphics to maintain customer recognition of the product. These super-sized, home-style cookies became popular among The Brownie Baker customers, and the deal was beneficial to both Carol and Perkins. In time, the Brownie Baker logo and graphics replaced Carol’s on the package (Houts, 2009).

Another interesting although less successful product innovation was “muffin tops.” This idea came from the episode of the popular television show, Seinfeld, where customers wanted to purchase just the tops of muffins because they were the “best” part (Feresten, 1997). The Brownie Baker already produced muffins, but for this product, a bigger...
cup was used to bake what looked like just a muffin top. Perkins didn’t want to cannibalize sales from the muffin line, so he created new flavors like mocha and cappuccino. Although the product was unique, sales were not what Perkins had expected and production was stopped. The customer’s value perception of the product may have affected sales, since the four ounce muffin top was priced the same as the six ounce muffin. Eventually Perkins decided to use the same baking cups to make “Baby Cakes,” after someone said that the muffin tops “look like baby cakes.” These cakes had new flavors with cheese and fruit fillings. Customers liked them, but production was a slow and difficult process, so Baby Cakes were eventually dropped from the product line too (Houts, 2009).

Regarding market trends such as “gluten-free” and “healthier” snack products, Perkins says those are ideas that for his type of product, “…sound good but customers don’t buy. There are some customers,” he explains, “but the universe is too small. Consumers want the real thing when they want a pastry” (Perkins and Marchant, 2013). Thus, the Brownie Baker is not developing special products to compete in this area.

Package design is similar for all the bakery’s products. Each item in the Brownie Baker line is individually packaged in clear wrap imprinted with the text design and The Brownie Baker elf logo. (On the Hispanic pastries the elf wears a sombrero instead of a hat!) This produces a higher quality appearance than packaging each item in plastic and then applying assorted stickers for labeling. Introducing new products also means creating new labels, and a significant commitment to the new product is required to justify the cost of new packaging (Houts, 2009). Developing the artwork and plate for printed film packaging costs between five and eight thousand dollars for each new product.

**PRODUCTION AND INVENTORY MANAGEMENT**

Employees work a 40-hour week with two ten-hour shifts that run Monday through Thursday. Over the last few years, the number of employees increased from 52 to 67, and production efficiencies have increased greatly as well. Three years ago weekly production could reach 2000 batches by Thursday or Friday, whereas now 2000 batches can be completed by Wednesday. When production is completed by Wednesday, Thursday becomes the day for deep cleaning and sanitation procedures. If production runs through Thursday, employees work overtime on Friday to clean the bakery.

Recently a major change was made in production scheduling and inventory management. Previously, the bakery would lump orders together, making what it estimated was needed for the week, one flavor of one product at a time. A week’s worth of double chocolate muffins would be baked, and then production would shift to a full week’s supply of another item, such as blueberry muffins. In some cases, a portion of that production went straight to freezer storage, as opposed to being shipped to a customer. The main perceived advantage of running large batches was reduced set-up costs, made possible by a facilities expansion that had tripled the freezer size. There were also disadvantages to this approach, however. Making all the items for a particular customer order might span several days or even require storing the product over the weekend before shipping it out. In a worst case scenario, product baked on a Monday might sit in storage until the following Monday waiting to be shipped. Thus, a significant portion of a product’s 21-day shelf life could be consumed while waiting for shipment, and money was tied up in this inventory while it was waiting at the bakery.

Today, most production is “made to order,” meaning it is baked to fill a specific customer order. Furthermore, a particular customer order is produced in full in a given day, regardless of how many different kinds of items are needed, and shipped immediately. Even Danishes, which are more labor intensive, can now be produced to meet demand instead of being made in large batches and frozen until needed. This greatly reduces inventory storage cost and dollars tied up in inventory, and the savings have more than outweighed the extra changeover and setup times for production. In fact, cash flow has improved tenfold, and in some instances the Brownie Baker receives payment from customers before paying suppliers. Even with such tight inventory control, allowances are made for emergency orders. The bakery makes about five percent overrun in case of emergency orders, but these extras are built into remaining orders at the end of the week if they are not needed elsewhere, exhausting all remaining inventory. 
The freezer is now used primarily for storing tiny donuts, which are produced by an outside supplier, sent to The Brownie Baker, and stored in the freezer until needed.

From a human resource standpoint, an important change was needed to accommodate the new production schedules. In the past 10 to 20 workers on a baking team were trained to make specific products. Employees making Danishes, for instance, only knew how to make Danishes. Now employees are cross trained for different products,
providing the flexibility needed for the shorter production runs and the increased variety of items that is produced each day.

The bakery places a Julian code on the film the day the product was baked, but it does not put a “pull date” to tell distributors when the product expires. How long it lasts depends on when it comes out of the freezer, either from the delivery truck or from the distributors’ storage freezers. Each box of product carries a label which reads “Code for 21 days.” When store employees place items on the shelf, they tag them with pull dates. Store employees must remember to rotate product as new shipments come in and keep track of when to pull the product off the shelf. The Brownie Bakers relies on distributors to maintain product freshness, which is another vital ingredient of its quality image.

LOCATION AND CAPACITY PLANNING

When Perkins bought The Brownie Baker in 1990 it operated from a 2,500 square foot facility. As demand grew, the bakery moved to a 5,000 square foot facility and then in 1996 to its present location which originally encompassed 30,000 square feet. Eventually, the present location reached its maximum production capacity. The question became how to make room for further growth and to increase operating efficiencies. Alternatives included expanding the existing facility, adding a building to the current location, or moving elsewhere. After exploring the costs and benefits associated with each of these location planning options, Perkins decided to expand his existing facility to its current size of approximately 40,000 square feet. This change could be made more quickly than moving or adding a building, and there were fewer regulatory issues involved. The new space was used for several purposes. Some storage racks were moved out of the baking area, leaving more room for production and packaging. Another area was used to install a much larger freezer (Houts, 2009).

SUPPLY CHAIN MANAGEMENT AND COMMODITY PRICES

Volatility in commodity prices means constant challenges to maintain costs and margins. All new servers, computer hardware, and financial software provide daily reports on costs. Commodity prices are a key part of this and are tracked carefully. Ingredients, such as eggs, flour, and soybean oil, have increased by 12-20% over the last three years. As compared to the huge price increases in the several years beginning in 2006, commodity prices now grow at a somewhat slower pace, with the exception of eggs, which still can vary greatly in price from month to month.

With the costs of inputs on the rise, The Brownie Baker seeks ways to maintain a reasonable profit margin. During the 2006-2008 period, several price increases were taken to help offset rising commodity prices. By doing so, Perkins kept margins high enough to stay afloat. By contrast, some of his competitors were slow to increase prices and in some cases went out of business. Then for several years, The Brownie Baker’s took no price increases, due to concerns about losing customers who had less discretionary income during the recession. When Marchant came to the bakery in 2011, price increases were taken in January and again in December, because they were urgently needed to keep up with costs. By 2013 products were very competitively priced, and another increase was not taken until the fall of 2013. Price increases have not been needed as often because of better management of purchasing, production costs, and distribution costs, reducing cost of goods sold and allowing margins to stay strong.

Today, about 20 percent of The Brownie Baker’s sales come from the San Joaquin Valley in California, up from 10 percent last year. The increase is primarily due to grocery stores now selling its brands. The West Coast market as a whole, which includes California, Washington, Oregon, Alaska, and Hawaii accounts for 80 percent of the bakery’s business, and all other business, including the East Coast, makes up the remaining 20 percent.

MANAGEMENT STYLE

Prior to purchasing The Brownie Baker, Perkins worked as Pepsi-Cola’s director of business development for Central California. After acquiring the Brownie Baker, some of his former Pepsi contacts helped him find markets for his bakery products. Working for Pepsi also gave him experience with merchandising and product placement (Houts, 2009).
Perkins is detail oriented, receptive, and generous. He treats his employees the way he wants to be treated, and he, as well as the other members of the leadership team, walk through the bakery at least a couple of times a day to keep in touch with immediate issues and concerns. Marchant refers to this practice as “walking outside your four walls” (Perkins and Marchant, 2013).

Meetings with production supervisors are held monthly, and supervisors relay information back to their employees, many of whom do not speak English. With the changes in top management that have taken place in the last three years have come many changes in methods and procedures, and workers have adapted well. Perkins often attends meetings and he encourages participation and elicits people’s ideas and comments. Perkins doesn’t just want “yes” people. He wants people who will give feedback to questions like, “What do you see that we’re missing?”, “What should we do more of or less of?”, or “What do you need to get more done?” “My communication style is very open,” he says. “People aren’t afraid to ask why we do something, and I don’t respond with, ‘Because I said so’” (Houts, 2009 at 46).

Some ideas generated at the meeting can be quickly implemented to improve worker satisfaction and productivity. These ideas might pertain to obtaining more tools and equipment, identifying time saving methods, or fixing problems with malfunctioning machinery. At one meeting, an employee voiced a concern that many brooms were broken. Within an hour, all the affected workers were supplied with new brooms (Houts, 2009). President Jeff Marchant adds, “Dennis is a clean freak, so any idea that helps keep things clean gets implemented” (Perkins and Marchant, 2013).

About 70 percent of line employees at The Brownie Baker are of Southeast Asian descent. Initially, many were hired as part of a longstanding outreach partnership with the Center for New Americans which assisted new citizens in finding jobs, and their loyalty is demonstrated by their long tenure with the bakery. Many line employees have worked at the Brownie Baker for fifteen years. Perkins attributes the low turnover to the fact that everyone is treated fairly and with respect. Goodwill is strong among workers from the Southeast Asian community, and Perkins appreciates their excellent work ethic.

CONCLUSION

The Brownie Baker continues to excel, despite challenges in the external environment. Difficulties foster innovations that make the company stronger. Cost pressures have led to improved efficiencies and margins which enable the bakery to offer its products at a competitive price. New leadership has brought fresh ideas and solutions, and customers continue to enjoy the many specialty baked goods The Brownie Baker offers.

REFERENCES


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BENCHMARKING PRACTICES FOR EMPLOYEE EMPOWERMENT

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Introduction

“One machine cannot do the work of fifty ordinary men. No machine can do the work of one extraordinary man.”

--- Elber Hubbard

Employees play a key role in the success of an organization and today Human Resource Management is being recognized as Human Capital Management. In order to meet the challenges of the competitive world around it is always required to do a continuous analysis of their performance for Employee Empowerment.

**Empowerment** is “the process of enabling or authorizing an individual to think, behave, take action, and control work and decision making in autonomous ways.”

It is the state of feeling self-empowered to take control of one’s own destiny but not something which can be delegated because it comes from individual and self direction.

Need for Employee Empowerment

**Employee involvement** means that every employee in an organization is valuable and is having worth and is having involvement in running the business; **empowerment** means that management recognizes his ability and provide employees with authority and tools required to continuously improve the process.

But the basic purpose of empowerment is lost in majority of organizations because employees expect it as a delegation process instead of a initiating and ongoing process in which an individual enabling himself to take action and control work and decision making in autonomous ways which comes from the individual.

Advantages of Employee Empowerment
More effective use of resources
- Increases individual job satisfaction
- Improves communication between employees and the management
- Develops quality consciousness among employees
- Helps to develop interpersonal, analytical and leadership skills
- Results in higher quality product

Thus **empowered employees are more innovative, creative, and resourceful**. They are free from the shackles of management, so they are happy and motivated at work and willing to take on new responsibilities.

The management should understand the goals and objectives of the organization and try to analyze the obstacles for employees productivity, identify all the possible sources of employee motivation and design empowerment programs for employees.

**Prerequisites for Employee Empowerment process are:**

1) Company culture to support a participative approach  
2) Healthy employee relations  
3) Acceptance of long term commitment  
4) Willingness to provide sufficient company resources  
5) Availability of Management attention  
6) Voluntary Participation  
7) Top management support  
8) Facilitator guidance  
9) Operational Support  
10) Training

**Steps in Employee Empowerment Process**

1. Clarity of the purpose, goals and objectives of empowerment
2. Willingness by employees and supervisors to accept responsibility
3. Communication and feedback to supervisors
4. Reward and recognition
Facilitating factors for Employee Empowerment – from Management perspective

a.) Maintaining Value for people
b) Shared Leadership Vision, Shared Goals and Direction
c) Building team work with commitment, innovation etc
d) Trusting People
e) Providing Information for Decision Making
f) Delegate Authority
g) Provide Frequent Feedback
h) Problem solving than pinpointing
i) Create a feel of Reward and Recognition

Management should understand primary aim for the company, obstacles for employee's productivity, sources of employee's motivation and knowing the empowerment level of the employees.

Inhibiting factors of Employee Empowerment

- Lack of clarity of the concept of empowerment
- Lack of employee involvement in designing empowerment programs
- Negative approach in reviewing employees recommendation
- Fear is another negative emotion
- Failure to respond towards employee recommendations
- Lack of clear understanding of training and feedback programs
- Failure in providing a suitable strategic framework

Every organization has the responsibility to create a work environment which helps to foster the ability and desire of employees to act in empowered ways. Any employee empowerment program must try to remove the inhibiting factors and enhance the facilitating factors for better empowerment. But most of the organizations are in great confusion in identifying such key facilitating factors which can directly contribute for achieving the goals and objectives of the organization.

Techniques for Employee Empowerment are:

Different techniques for employee's involvement include suggestion systems, team work, focus groups, surveys, self – directed work groups, incentive program.

Some other methods are –

a) Giving responsibility to employees
b) Training employees to accept responsibility
c) Communicating and giving feedback
d) Giving reward and recognition
e) Process reengineering
f) Employees involvement
g) Total quality management - Benchmarking
As such organizations are regularly looking for new ways and methodologies to improve their performance in order to gain competitive advantage. As they seek improvements to their own business processes, many organizations recognize the importance of learning from best practices that have been achieved by other organizations. By removing the need to reinvent the wheel and providing the potential to adopt proven practices, benchmarking has become an important methodology for providing a fast track to achieve organizational excellence. [From Everything You Need to Know About Benchmarking by Robim Mann]

**Benchmarking**

In 1989, Robert Camp introduced a new tool called Benchmarking into the Total Quality Management world; it was quickly adopted by industrial organizations and also became a part of the Malcolm Baldrige National Quality Award (MBNQA). Xerox has emerged as the leader in the benchmarking process.

**Benchmarking** is “the process of identifying, understanding and adapting outstanding practices from organizations anywhere in the world to help an organization for its excellence”.

Benchmarking denotes a comparison with selected performance indicators from different organizations typically in the same industry or with comparable organizations that are considered to be the best in class. One of the biggest mistakes people do while they perform Benchmarking is that they only look to benchmark someone within their own industry, generally their competitor. But if the competitor is worse than their own company then it leads to ineffectiveness. Instead it might be good to benchmark a company that is well known for being a good model, referred to as Best practices, exemplary practices and Business Excellence. [HRfolks.com]

**Benchmarking** is an effective management tool that helps to identify the changed ideas and brings feasible changes to achieve continuous improvements in the way an existing activity, function or a process is to be performed. It forms a base to the strategic business process improvement and reengineering. To implement this method a company compares its performance with its strong and more successful competitors in the industry. It helps a company not only to assess its performance comparing with others but also to learn best practices from others to improve self functioning. This helps to improve productivity and cost reduction along with new performance targets which can give a competitive edge.

A successful **Benchmarking** requires careful selection and manipulation of comparable measures. Thus **Benchmarking can contribute to identify the Key Performance Indicators** in comparison with other organizations or within the same organization and by analyzing them one can understand gaps to be fulfilled for better performance of employee empowerment.
Process of Benchmarking - Five Stages

1. Proto-planning
   - Decide what you wish to benchmark
   - Decide against whom you need to benchmark
   - Identify outputs required
   - Determine data collection methodologies

2. Data collection
   - Secondary/background research
   - Primary research - from the benchmark

3. Analysis
   - Of the gaps
   - Of the factors that create the gaps (enablers)

4. Implementation
   - Implementation planning
   - Roll-out of new modus operandi (changes)

5. Monitoring
   - Collecting data
   - Evaluating progress
   - Iterative change

Key drivers for Successful Benchmarking
- Identifying other companies which are role models for learning
- Acquiring reliable and valid data from these companies about their best practices and standards and how these are set in the critical areas of one’s concern,
- Determining current competitive gaps and understanding the strategic reasons for the gaps
- Reengineering, improving, or innovating upon existing practices and processes to achieve better standards in critical areas
Set up an action plan to induct the identified betterments
Motivating the employees for effective implementation of the process of benchmarking.

If the same set of people are involved in all stages of benchmarking the risk of resistance will be very less. The abilities, experience, professional competence, influence and commitment of the people involved in benchmarking are the other factors critical to its success. A majority of employees can be tuned to benchmarking if its success can be exemplified with respect to a particular activity or process. The progress should be regularly monitored and the standards recalibrated to achieve continuous improvement.

Some examples of companies that stand out for their best practices through benchmarking are:

<table>
<thead>
<tr>
<th>Benchmarking Type</th>
<th>Definition</th>
<th>Examples</th>
<th>Advantages for Employee Empowerment</th>
<th>Disadvantages for Employee Empowerment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Benchmarking</td>
<td>Similar activities in different locations, departments, operating units, country etc</td>
<td>US manufacturing practices vs. Fuji Xerox practices of Japan - Marketing Strategies by division copiers vs. work stations</td>
<td>Good results for diverse excellence within the company</td>
<td>Limited focus</td>
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<td></td>
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<td></td>
<td>Employees gain recognition, carry pride</td>
<td>Internal bias</td>
</tr>
<tr>
<td>Benchmarking Type</td>
<td>Definition</td>
<td>Examples</td>
<td>Advantages for Employee Empowerment</td>
<td>Disadvantages for Employee Empowerment</td>
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<tr>
<td><strong>Performance / Competitive Benchmarking</strong></td>
<td>Direct competitors selling same customer base</td>
<td>➢ Sharp, Cannon, Ricoh, Kodak, Buckman labs – KM Integration</td>
<td>➢ Positional identity can be understood and employee gets updated with relevant information. ➢ Plan for better succession planning ➢ To understand and assess better practices for employee empowerment</td>
<td>➢ Data collection difficulties ➢ Ethical issues ➢ Antagonistic attitudes</td>
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<td><strong>Strategic Benchmarking</strong></td>
<td>Businesses need to improve overall performance by examining long term strategies; involves considering core competencies, development of new products and services</td>
<td>➢ GE- strategic planning ➢ Microsoft, Google ➢ Oreilly Publishers – Product line cognition</td>
<td>➢ Helps as a guide to change business line / enter into new markets ➢ Scope for innovative thinking and creativity ➢ Scope for learning multidisciplinary skills and enter into new jobs</td>
<td>➢ Implementing results take long time to materialise ➢ Threat of failure of new launches ➢ Employees might experience role stress during failure</td>
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<td>Process Benchmarking</td>
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<td>Focuses on improving specific critical processes and operations with organizations in similar services</td>
<td>➢ Former Netscape Corporation-speed of production development</td>
<td>➢ Efficiency and Effectiveness of organization increases</td>
<td>➢ Failure of technology may cause business failure and create frustration among employees</td>
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<td>➢ Toyota - JIT</td>
<td>➢ Employee efficiency &amp; effectiveness increases</td>
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<td></td>
<td>➢ Skandia – KM measurement efficacy</td>
<td>➢ Adoption to new technology increases</td>
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<th>International Benchmarking</th>
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<tbody>
<tr>
<td>Best practitioners are identified and analysed worldwide</td>
<td>➢ Motorola – quality management</td>
<td>➢ Helps to achieve world class recognition</td>
<td>➢ Consumes more time and resources</td>
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<td></td>
<td>➢ McDonalds – Franchising</td>
<td>➢ Employee branding and employee excellence</td>
<td>➢ Cultural shocks due to comparison of standards</td>
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<td>➢ Disney – Brand Management</td>
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<td>➢ Intel – chip designing</td>
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<td>➢ IBM</td>
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| Functional / generic Benchmarking | Organizations recognized as having state of the art products/services/processes | Apple Computers - Customer loyalty  
Walmart - Logistics  
L.L.Bean - Warehousing  
Federal Express - Shipment status tracking  
American Express - Customer Service | High potential for discovering innovative practices  
Functional Performance improves drastically  
Job Enrichment for employees  
Increase in employee satisfaction, motivation and morale | Employees might show resistance to change |
|----------------------------------|-----------------------------------|---------------------------------------------|-------------------------------------------------|--------------------------------------------------|
| External Benchmarking            | Analyzing outside organizations that are known to be best in class | Johnson & Johnson – for baby care products  
E-machines INC, Southwest Airlines, TACO Bell – Cost based competition through market demand volume | Provides opportunity to compare with best leading organizations  
Employee enrichment | Might take long time to generate results  
Initiation may not be so easy  
Adaptivity Problems among employees |

**Benchmarking Practices for Employee Empowerment - Examples**

GE practices employee benchmarking. According to Jack Welch “if the rate of change inside an organization is less than the rate of the change outside … their end is in sight”. One of the
tools used by Jack Welch to ensure constant reassessment and Benchmarking is the annual review undertaken by every GE executive and staff member. Once a year, every employee's performance will be evaluated and awarded a numerical ranking of between 1 and 5. The implicit understanding is that “both the individual and his or her score are moving up or its time to leave the company.”

Infosys Narayanamurthy in his Five Keys To Building a Great Company states that Leadership, vision, Benchmarking, Measuring to improve and shared values are important pillars for building a successful organization. Under Benchmarking a company has to benchmark itself on a global scale in every area including sales, production, human resources, R&D and finance. It creates an open and confident environment where first-raters recruit first-raters.

Hewlett-Packard uses Benchmarking to Plan for Career Development & Education Offer Services and Support to Help Employees Develop and Meet Changing Organizational Needs. It selects and manages its business with a goal of providing long-term employment for its people and opportunities for personal growth and development. In return HP employees are expected to meet the performance standards on the job and adjust themselves to changes in the work and learn new skills and apply them at wherever required. HP believes that this flexibility is important to maintain employee satisfaction in the light of technological change and intensifying worldwide competition. HP also practices Management diversity training programs since 1988. It is given to the company’s first and second level managers. One improvement opportunity identified within the program was the company’s lack of top-down approach.

Dell uses Benchmarks throughout the technology assessment and system development process to help ensure that Dell server and client systems provide a balance between performance, features, cost, quality, and reliability.

Microsoft regularly practices Benchmarking in different areas of its business. For example in fixing pay structure for its employees it goes by benchmarking across the industry.

Bank of America Merrill Lynch also practices Benchmarking tool for revising employees pay structure.

Federal Express (Baldrige Winner) Plan for Career Development & Education Develop a Career Plan for Each Employee: Federal Express employs extensive certification procedures — which must be annually updated and renewed — to ensure competency in critical skill areas for all line jobs and management positions. Through these certification procedures, FedEx can keep up-to-date tabs on individual employee skill levels and identify areas where large-scale training needs are not being met.

By Providing Various Training Options to Meet Diverse Needs: Federal Express is a recognized world leader in training. The company's extensive education and development programs include computer-based training, satellite broad-cast training, and staff-conducted training. FedEx excels in the area of cost, effectively delivering training to a massive work force in many locations operating 24 hours each day.
Conclusion

Empowerment is one of the most effective ways of enabling employees at all levels to use their creative abilities to improve the performance of the organization they work for, and the quality of their own working life. When this is done under continuous measurement with the Benchmarking process it can result in Best Practices.

“you can’t manage what you can’t measure” – Peter Drucker

References:

Books

Websites
1. http://apqc.org