

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

186,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Knowledge Sharing and Human Resource Development in Innovative Organizations

Michael Beyerlein, Rachele Collins, Shinhee Jeong,
Christi Phillips, Suravee Sunalai and Lei Xie

Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/intechopen.70067>

Abstract

Global competition and rapid changes in technology demand more innovation in organizations. Such an increase in innovation depends on developing the capabilities of employees and providing them with knowledge management support that accelerates learning and discovery. Leading companies have been creating work environments that emphasize learning and knowledge management since the turn of the century. This chapter presents profiles of practices in five such companies and draws conclusions that result in a model that ties human resource development (HRD) practices to knowledge management practices as a guide for other organizations.

Keywords: innovation, human resource development, knowledge management, knowledge sharing, learning and development, collaboration, communities of practice

1. Introduction

Innovation is a key driver of economic growth. New and improved products, processes, and services account for the bulk of trade and industry advancement since the Industrial Revolution. Technology innovations receive a lot of the credit for economic growth. However, modifications in organizational design, infrastructure, policy, and other factors in the organizational ecosystems also deserve significant credit. All these changes depend on generation of new knowledge and its application. In recognition of the central role of knowledge in organization performance, the field of knowledge management (KM) emerged as a focus on improved understanding of the processes and their links to organizational performance

in modern organizations [1, 2]. Simultaneously, the field of human resource development (HRD) emerged with a focus on improved understanding of the processes of learning and development (L&D) in organizations and their links to performance [3]. KM and HRD seem to intertwine naturally in their approaches to organizational effectiveness.

HRD processes change the competencies of employees at all levels in an organization and thereby play major roles in driving innovation and economic growth. People competencies and the way those competencies are leveraged across the organization due to changes in organizational design occur largely because of innovations in the HR, human resource management (HRM), and human resource development (HRD) departments—the people development functions in the organization. In that trio of special functions, HRD focuses on learning and development at the individual, team, and organizational levels. Innovation inside an organization occurs when employees have the knowledge, skills, and attitudes for learning, taking thoughtful risks, sharing knowledge, and thinking creatively, and the organization's systems provide needed support [4]. Ishak et al. [5] suggest KM is essential for developing the human resource. We further suggest HRD is essential for growing the knowledge that flows through the KM system.

1.1. Applicable literature

Although many definitions of innovation have been published, we will select the following: innovation is executing new ideas to create value [6]. Crossan and Apaydin [7] refer to innovation as both a process and an outcome. Using a complex adaptive systems framework, Harkema [8] linked learning and knowledge generation when he defined innovation as a knowledge process for generating new knowledge, so it drives incremental or radical change.

This chapter focuses on KM and HRD practices that enable innovation within some of the world's most innovative companies. Examples from these innovative organizations will facilitate an understanding of the way enablers and critical success factors of innovation, KM, and learning are implemented for competitive advantage.

A learning organization consists of formal and informal systems that facilitate learning by its members and rapid change in adapting to the environment—a culture where learning drives proactive change. Knowledge sharing benefits from developments in any part of the learning organization that improves the flow of knowledge. For example, HRD work in the organization can build up the communication-related competencies of employees, upgrade organizational design to reduce silo effects, and develop employees' ability to effectively utilize technology, all of which contribute to knowledge-sharing capability within the organization. HRD plays a pivotal role in leading innovative activities with responsive guidance [9]. HRD practitioners increase learning effectiveness from individual, group/team, and organizational levels. Through continuous learning and improving, HRD fosters a culture that favors innovation [10]. In addition, HRD offers diverse solutions to explore challenges by analyzing the organization from the organization development standpoint [11]. Finally, HRD creates reward mechanisms that motivate employees to challenge the status quo and embrace change.

We view KM as “an iterative process of handling actionable knowledge that results from individual, group, and organizational learning to improve organizational performance” [12]. In this context, knowledge consists of individuals’ insights, experiences, know-how, and values that are justified through social interactions among participants [13] to make knowledge actionable and embedded in organizational repositories [14]. Consequently, KM functions so organizations can use their actionable knowledge effectively to improve their performance [12]. Generally, HRD can contribute to innovation by promoting organizational activities that better manage the flow of knowledge (i.e., to acquire, create, store, share, use, and assess) throughout an organization [15].

Formal, informal, and incidental learning drives innovation in industry [16–18]. Practitioners in HRD develop learning systems that include an emphasis on career development, training and development, and organizational development. The field of HRD has been changing rapidly over the past two decades and finds itself in a special role in companies of all sizes that make its tools and processes highly valuable in the rapidly changing organizations of the twenty-first century.

In this chapter, we profile five organizations where HRD provides the kind of support that makes learning and development central to the strategic development of knowledge-based organizations. Based on interviews of HRD staff members in these organizations and a study of their Websites, publications, and company reports, we present ways in which HRD creates conditions for enabling knowledge sharing and learning and the processes that enable innovation within these organizations. The five innovative organizations discussed in this chapter include Air Liquide based in France, Krungthai Card Public Company Limited (KTC) in Thailand, and Rockwell Collins, FMC Technologies Inc. (FMC Technologies), and Praxair in the USA (**Table 1**). This sample of innovative organizations was intentionally selected to represent a diverse set of countries and industries as a way of illustrating ways that HRD can promote learning and change inside organizations that stimulates their ability to innovate.

Sustainable organizations are complex, adaptive systems [19]. The challenges that organizations and their employees face today in turbulent market conditions demand an internal environment of continuous learning and knowledge creation, transfer, and sharing as keys to adaptation and innovation and a culture that stimulates a risk-taking mindset. The inter-related processes of learning and knowledge creation occur within a social and a cognitive system embedded in a hierarchy of complex systems. Many hurdles to effective learning and knowledge creation, transfer, and sharing in those systems impede the processes that promote problem solving and utilization of process outputs. Few aspects of the work environment effectively promote those processes. HRD professionals develop the required human capital and create a work environment that unleashes and leverages its human capital for continuous innovation. The same types of HRD tools and methods may be at use in several organizations, but their application depends on the local culture. The next section presents five profiles of innovative organizations using tools and methods of HRD to create more effective knowledge management systems (KMSs). The profiles are necessarily brief and so provide only a small slice of the dynamic processes of human capital development in these companies.

	Praxair	Air Liquide	Rockwell Collins	FMC Technologies Inc.	Krungthai Card PCL.
Industry	Industrial gas & chemicals	Industrial gas & chemicals	Avionics & IT systems	Oil & gas	Consumer finance
Country	USA	France	USA	USA	Thailand
Year founded	1907	1902	2001	1928	1996
Core values	1. Safety; 2. Governance; 3. Energy and climate change; 4. Eco portfolio; 5. Sustainable productivity; 6. People development	Rely on operational excellence, selective investments, open innovation, a network organization	Access, connect, transcend	1. Safety & sustainability; 2. Collaboration; 3. Innovation; 4. Valuing people; 5. Integrity; 6. Customer-centered; 7. Quality	1. Modern; 2. Dynamic; 3. Professional; 4. Simple; 5. Fun
Corporate cultural areas of focus	Diversity, employee, community, and stakeholder engagement	Innovation, new product development; expand and develop new markets	Accelerate knowledge, create value enterprise-wide	Living corporate values; put customers and clients first	Mission-based projects; employee satisfaction

Table 1. General company characteristics.

The companies were selected from the Fortune 500 list but also had to be recognized for their innovativeness. They represent a variety of industries and locations.

2. Case studies

Five case studies of twenty-first century organizations are presented below to illustrate how they have found ways to use HRD practices to improve innovation capability in their organizations. Each case shows unique features as the search for ways to increase innovation capability is tailored to the business context.

2.1. Praxair

Praxair, a Fortune 500 company based in the USA, was selected because of its ranking by *Forbes Magazine* on the list of the “World’s Most Innovative Companies” [20] and the Achievers 50 Most Engaged Workplaces™ in North America for 2016 [21]. Praxair is one of the largest industrial gas companies in the world. The organization’s primary products are atmospheric and process gases for industrial customers in approximately 50 countries.

The vision for Praxair is “to be the best performing industrial gases company in the world” [21]. This performance culture is driven and reinforced by six priority factors: (1) safety; (2) governance, ethics and compliance; (3) energy and climate change; (4) eco portfolio (environmental innovation and product stewardship); (5) sustainable productivity; and (6) people development. The sixth priority involves four key performance indicators: diversity, employee engagement, community engagement, and stakeholder engagement. Additionally, Praxair’s mission is “making our planet more productive,” as the company serves customers and the planet for economic and environmental improvements. Success with that mission is reflected in Praxair’s consistent placement on the Dow Jones Sustainability World Index for 13 consecutive years [22].

Development of human capital inside Praxair has involved continuous investment for decades. To create a culture based on the core values and achieve performance goals, senior leadership decided to have HR play a more strategic partnership role in 1999 [23]. The mandate for HR was to

1. develop the next generation of Praxair leadership,
2. accelerate employee development and new talent acquisition, and
3. improve integration of business and HR activities.

These three goals for HR operationalized the vision of the firm as it entered the twenty-first century.

The HR team chose eight avenues to pursue these goals:

1. Promote diversity and the core of talent management [24].
2. Create a global mindset.
3. Develop leadership at all levels of the organization—“blended executives” as professionals with subject matter expertise [25].
4. Build a high level of employee engagement.
5. Align HR process with the business via rewards and recognition, goal setting, and team design.
6. Warehouse HR and customer information for data analytics to drive intelligent decision making [26].
7. Develop a more effective knowledge management system.
8. Create a more comprehensive approach to training and development.

Early success with the Praxair program was reflected by the inclusion of the company as the focus of one of 17 chapters in Carter et al.’s [27] book *Best Practices in Leadership Development and Organization Change* which profiled leading innovators in leadership and organization development. The programs for HRD have continuously evolved at Praxair as exemplified by the following sample of topics.

2.1.1. *Job autonomy*

Based on clear communications around corporate vision, goals, and mission, Praxair gives enough autonomy to all business units to run their own business. Compared to other companies in the chemical industry, Praxair has fewer controllers, commanders, or instructors who regulate or monitor employees' job-related behaviors. Praxair encourages employees to be creative thinkers, to accept and explore different or new perspectives to solve problems, and to expand conceptual frameworks. The flexibility and the absence of rigid job design can be also exemplified with these five principles representing careers at Praxair: "explore your possibilities; build your skills; enjoy your challenge; make your mark; and own your future" [21].

2.1.2. *Learning and development*

Learning and development (L&D) provides formally structured and informal learning opportunities to facilitate employees pushing the limits of knowledge and experience. Praxair regards every aspect of employees' actual job performance as a part of L&D. A special emphasis has placed knowledge sharing through mentoring at the center of the L&D process. The social support of learning emerges from mentoring relationships. Mentoring of women and by women leaders represents an important part of that emphasis. Praxair formally trains technical personnel in mentoring skills to accelerate the sharing of both technical and soft skills knowledge. The rapid development of new hires in both hard and soft skills prepares them for filling the gap created by retiring senior employees through mentoring relationships. Mid-career employees with advanced degrees may leave for other opportunities, so Praxair uses job shadowing and cross-training for all employees and internships, and job transfers for invited employees to achieve continuous development. Because of the risk involved in manufacturing processes, safety training and safety culture become a primary goal of L&D. The most knowledgeable employees in each work group earn the title of subject matter expert (SME) or corporate fellow [28]. Furthermore, Praxair puts a great emphasis on leadership development, not only for current leaders but also for the next generation of leaders. For example, Praxair uses simulations to develop leadership capability in technical staff with three levels of challenge—early career, mid-career, and longer service—where teams work together to solve problems of a fictional enterprise with ever-changing circumstances [29].

2.1.3. *Knowledge management*

Firmly grounded in the corporate mission/vision, Praxair operates productivity programs by sharing the best practices. Each employee is mandated to contribute to productivity goals that are measured in hard dollars. A sense of urgency is created to emphasize personal accountability balanced with the skills for teamwork. Furthermore, the company, especially the global engineering business unit, runs communities of practice (CoP) for knowledge creation and dissemination. Praxair launched an on-demand video system in 2010 and an ask-an-expert system in 2011 [30] to facilitate the sharing of knowledge between senior employees on the verge of retirement and less experienced employees. Viewing of the videos increased exponentially because of

leadership support. One key has been easy access to videos through such mechanisms as links embedded in E-mails. The technology for the ask-an-expert system has evolved from SharePoint to a customized system to increase effectiveness. Requiring every community of practice to participate with one or more questions per month increased participation and value [31].

2.1.4. Summary

Innovation involves the ideas and efforts of organizational employees. As their knowledge, empowerment, and engagement grow, so does innovation capability. Praxair has made a number of deliberate changes over recent years to build that capability.

2.2. Air Liquide

Headquartered in Paris, France, Air Liquide was founded in 1902 by a group of French scientists and engineers seeking to develop and commercialize a new process for air liquefaction (thus leading to the name of the company). During this period, Paris was considered a beacon of the arts, scientific research, instrument and tool manufacturing, banking, and venture capitalism and “an incubator for technological innovation and for the formation of high-tech start-up companies, not unlike what Boston/Cambridge and Silicon Valley would become in the United States in the late twentieth century” [32]. Smith refers to primary founder of Air Liquide, Georges Claude, as “France’s leading industrial scientist of the last 100 years” (p. 51). Claude’s inventions, creativity, and persistence were key drivers of innovation and success throughout the organization’s early years.

Since its founding in the early 1900s, the organization has grown to be one of the world’s top two industrial gas suppliers, providing oxygen, helium, nitrogen, carbon dioxide, and argon to business customers in the automotive, chemicals, food and beverage, semiconductor, and healthcare industries. Today, Air Liquide employs approximately 51,500 people across 80 countries and generated over \$18 billion in sales revenue in 2015 [33] (these figures do not include the May 2016 acquisition of Airgas).

2.2.1. The importance of innovation at Air Liquide

Innovation has been a key part of the corporate identity since the organization’s founding. An excellent history of Air Liquide’s early years of innovation can be found in Smith’s [32] article “Product Innovation and the Growth of the Large Firm: The Case of Air Liquide, 1902–1930.” New product development and innovation are important parts of Air Liquide’s strategy as the organization endeavors to continuously improve its production technology, expand existing markets, and develop new markets.

2.2.2. Role of HRD and KM in facilitating innovation

Air Liquide leverages employee development programs, such as technical career pathing, mentoring, and high potential programs, along with more traditional KM approaches such as communities of practice, to facilitate knowledge sharing, transfer technical knowledge, and foster a culture of innovation throughout the organization.

From a developmental standpoint, human resources has established a Technical Career Leaders (TCL) dual career ladder, created in 2003, that serves to identify, develop, recognize, reward, and retain key technical expertise within the organization as well as facilitate the transfer of their knowledge. The TCL program includes six levels: two local levels and four international levels. The program offers structured, yet flexible, career tracks where technical talent has the option to develop and progress in their careers within either the technical or the managerial path, and the flexibility to move between career tracks during their careers. Each track includes mentoring, training, networking, and other developmental opportunities for participating employees.

TCL is a worldwide program covering all Air Liquide business lines. As of June 2016, there were approximately 2500 experts representing 67 nationalities participating in the TCL. Technical areas encompassed in the TCL program include electronics, engineering and technology, healthcare, industrial merchant (cylinder, bulk, and onsite; and applications and services), large industries, and research and development, and each of these areas has its own domain of expertise. Employees are selected to participate in the TCL program based on criteria such as their participation in knowledge transfer activities, their leadership and influence abilities, and their capacity to communicate and deliver on their technical vision and innovative ideas.

Within the Large Industries Business Line in North America, Air Liquide also engages select early- to mid-career high potential technical talent in a LEAP (learning, experiencing, and progressing) developmental program in order to accelerate time to competency of these employees and retain and engage this key employee population. An analysis of this technical population revealed that there was insufficient pipeline to fill anticipated gaps in technical roles due to attrition of technical experts. Therefore, the LEAP program was instituted in 2013 in order to provide early- to mid-career high potential technical talent with the practical, technical training and experiences that they need to quickly advance in their careers at the organization. The LEAP program began with 24 employees; today there are approximately 75 employees participating (45 protégés, and the remainder coaches, trainers, and managers). Each protégé is assigned a coach (some coaches have more than one protégé). The program consists of 10, three-day classes, supplemented with computer-based training, to cover technical content as well as soft skills training. Protégés are assigned a set of technical objectives at various points throughout the program to complete over the next 12 months, under the guidance of their coach. The program offers participating employees a variety of experiences and learning opportunities in an accelerated fashion in order to speed their developmental process, and help transfer technical knowledge from the coaches to their assigned protégés.

From a knowledge management perspective, Air Liquide has established technical communities of practice (CoPs) at a worldwide level, the business line level, as well as at the more regional hub level. For example, as of June 2016, the company has 7 worldwide technical CoPs established and 10 technical CoPs within the large industries business line in Europe. Hubs for the Americas, Asia Pacific, and Middle East Africa are in the process of establishing their own CoPs. The intent of the technical worldwide CoPs is to set standards, establish technical vision, and identify technical best practices. The hub CoPs, in turn, focus on

implementing the best practices identified in the worldwide CoPs and people development. All communities facilitate knowledge sharing and transfer within the organization. Within the Americas zone, both formal and informal communities leverage Google Plus Sites as the enterprise platform to facilitate and enable virtual collaboration, content sharing, and Q&A amongst site members.

2.2.3. *Summary*

Programs such as TCL and LEAP facilitate innovation on an individual level by presenting employees with multiple and diverse opportunities for learning and growth and on a collective level by enabling employees to learn from one another and build on the ideas of others. Similarly, CoPs at Air Liquide provide forums for networking, knowledge sharing, and employee development, ultimately fostering individual and organizational learning and innovation.

2.3. **Rockwell Collins**

Rockwell Collins, Inc., headquartered in Cedar Rapids, Iowa, provides avionics and information technology systems and services to governmental agencies and aircraft manufacturers. The organization went public in 2001 as a spin-off from Rockwell Automation and has been experiencing tremendous growth over the past decade. Rockwell Collins runs operations in 60 locations with nearly 20,000 employees around the globe (Rockwell Collins, 2014). Its aircraft electronics are installed in the cockpits of nearly every airline in the world, and its airborne and ground-based communication systems transmit nearly 70% of all U.S. and allied military airborne communication. The organization also provides flight simulation and training, MRO (maintenance, repair, operations) services, navigation, and surveillance systems [31].

2.3.1. *Innovation culture and knowledge management*

Since 2001, Rockwell Collins has undergone a period of rapid growth. The unprecedented growth was a primary driver of its KM system. With the rapid expansion of the organization, the necessity to connect new employees with existing knowledge and expertise worldwide became increasingly urgent [31].

The history of Rockwell Collins' KM system can actually be traced back to 1999. In order to fulfill the mission of "access, connect, and transcend," corporate leaders developed a KM system to "accelerate knowledge, and create value" enterprise-wide [34]. Over the past 10 years, each department of Rockwell Collins has been closely connected by the KM system. Currently, many KM approaches and tools, such as communities of practice (organized groups for employees to share and learn), Epedia (companywide Wikipedia), Lessons Learned (a reflection tool in Epedia), and Enterprise Tools Integrated Forum (questions and answers forum) are used daily [35–37]. Rockwell Collins has promoted a learning culture by combining its formal training and development processes with these industry leading KM programs [34, 38]. The five to ten awards won by Rockwell Collins each year, include Blue Ribbon winner for Innovation by *Military Training Technology* magazine in 2014 [39].

2.3.2. HRD's role in innovation

There are several strategies that HRD leverages to support innovation at Rockwell Collins. For example, a virtual university (Rockwell Collins University) functions as the catalyst for innovation. The University employs highly developed e-learning systems to offer courses efficiently. Technology enables employees to access learning anytime and anywhere. Within the learning culture at Rockwell Collins University, e-learning is a richer source for learning beyond videotapes or online tools only. Employees seek answers actively instead of being offered solutions. For example, learning and development specialists regularly assess the need to retain the core knowledge that senior employees may take away when they retire. Learning and development specialists worked with the Performance Engineering Group (PEG) to invent "QuickLearns," computer-based tutorials featuring subject-matter experts performing key tasks [40].

At Rockwell Collins, a learning culture that emphasizes sharing has been formed with HRD's assistance. For example, HRD specialists facilitate ad hoc meetings with engineering-group leaders who have suggestions and feedback regarding training programs at Rockwell Collins. As a group, HRD specialists use such venues as one mechanism to identify training needs [40].

2.3.3. Summary

One pervasive risk to many technical organizations is employees leaving the organization with critical technical, cultural, and social knowledge that is difficult to replace. As a learning organization, Rockwell Collins leverages the HRD strategies and the well-established KM system described above to create a culture that recognizes inquiry, feedback, and creative thinking. The KM system helps the organization navigate both planned and unplanned organization change.

HRD at Rockwell Collins leverages training and development and knowledge sharing through KM tools to support organizational learning on each level (individual, team, and organizational). As a result of HRD's efforts to facilitate innovation, the organization has experienced several positive changes. First, the creation of a learning culture fosters innovation and out-of-the box thinking. Second, the implementation of KM programs facilitates knowledge sharing at the company more freely and efficiently. Finally, the company has created healthy recognition and reward mechanisms that encourage knowledge sharing and innovative behaviors by employees. In Rockwell Collins' case, formal and informal learning programs are complemented by a firmly established KM system, which makes the company a learning organization that encourages employees to think and work innovatively.

2.4. FMC Technologies, Inc.

Headquartered in Houston, Texas, FMC Technologies is a publicly traded oil and gas equipment services company, specializing in subsea, surface technology, and energy infrastructure. It was originally founded in 1884 as the Bean Spray Company, but then changed in 1928 to the Food Machinery Company, which is where the FMC initials originate. FMC Technologies was recognized by Forbes on its list of most innovative companies in 2013 [20]. At that time, FMC

Technologies ranked 17th on Forbes' international list of innovative organizations, based on their innovation premium. The innovation premium is the difference between a company's market capitalization and a net present value (NPV) of cash flows from existing businesses [20]. Companies with a market cap above NPV of cash flows are ranked in order of the most market cap above NPV to the least. FMC Technologies had a market cap of \$12.4 billion USD.

Foss et al. [41] provide a solid definition of knowledge sharing, which is "...the provision or receipt of task information, know how, and feedback on a product or a procedure" (p. 458). The core beliefs espoused by early HRD practitioners and theorists include the notions that HRD itself is the process and practice of developing, harnessing, or releasing of human expertise through individual and organizational development in order to improve performance [42]. This is evidenced in these platforms of knowledge sharing at FMC Technologies: The Women's Leadership Program, a comprehensive program for the development of women as leaders; the Edge, a formal knowledge management system (KMS); WellLinked, a quarterly employee publication; and a business model of formalized internationally based centers of excellence (COEs). The HRD-specific function each of these platforms is discussed in the next section.

2.4.1. *Knowledge sharing, innovation, and HRD*

Knowledge sharing supports organizational productivity and also enriches its credibility with the marketplace and stakeholders [41]. HRD enhances knowledge exchange at FMC Technologies in three key internal areas that drive external value:

1. Leadership and talent development—Sustainment of success and mindfulness is critical in the leadership and talent development disciplines within FMC. The strategic purpose of the Women's Leadership Program is to support employee's potential and also to attract and retain top talent. Women learn about leadership roles, behaviors, styles, and leading teams, as well as focus on career development and leadership skills necessary for them to be successful. The company monitors the career advancement of the participants to ensure their success and that of the program [42].
2. Team learning and expertise development—A web-based application called the edge allows technical staff to post issues to a single location to receive electronic suggestions, responses, and answers from other knowledge workers within FMC Technologies. Technical staff make use of this global technology knowledge-sharing platform that enhances team learning, giving people opportunities to problem solve with others around the world. If a team member is having an issue or experiencing a challenge, another employee anywhere in the world can provide expertise from a virtual community with thousands of members. In addition to sharing expertise, employees learn about the various working conditions of their colleagues [42].

One of the most prominent features about this organization is consistent messaging about its internal organizational and operational expertise. FMC Technologies publishes a quarterly global employee publication called WellLinked highlighting the success of employees, teams, and organizational plans. The magazine's purpose is to inform all employees on the forward progress of the organization and any updates in organizational strategy [42].

- (3) **Networking**—FMC boasts 50 online networks established to focus on different parts of the business. Any employee can read content shared within a network, but the people who work in the specific area of the operation run or manage the network. One of the networks, the New Hire Network, helps new hires get their questions answered. Team members welcome them, provide responses, and let them know how to find necessary resources [42].

2.4.2. *Summary*

HRD's role in innovation at FMC Technologies is to support collaboration and community building that contributes to performance through knowledge sharing. The work of HRD is an antecedent to this organization's ability to support its customers' success. FMC Technologies' stance on innovation is girded by formal organizational structures that ensure knowledge sharing, which makes their customers and the company, in turn, successful.

2.5. **Krungthai Card PCL (KTC)**

Krungthai Card Public Company Limited (KTC), a consumer finance service provider in Thailand founded in 1996, represents one of the Thai companies, recognized from the Stock Exchange of Thailand, as an innovative organization. KTC was the first Thai financial firm to reform itself into an innovative organization in order to make a difference in its corporate identity.

The company's core values (modern, dynamic, professional, simple, and fun) help KTC build a new corporate identity that differentiates it from its competitors [43]. To manage its identity, the company aligns the five core values with innovation infrastructure capability. The innovation infrastructure capability, which includes the organization structure, the organizational culture, and leadership style, supports the development of creativity and innovation. KTC's structure is characterized by low levels of hierarchy, high levels of cross-functional collaboration, and decentralization of decision making. The KTC corporate culture involves team mission-based projects, modern and dynamic working styles, and a workplace orientation focused on employee satisfaction. KTC leaders emphasize a people-oriented management approach and play an important role in managing organizational change related to creative and innovative capabilities.

2.5.1. *Learning and innovation*

Regarding KTC's corporate identity, the organization encourages employees to become dynamic and collaborative in order to cope with change in its business markets. KTC assumes that if the company sustains a relaxing learning environment, employees are able to generate a high degree of creativity and innovation.

At KTC, creativity in employees is developed through a lively and collaborative learning climate. The learning climate is shaped by the five core values that align with the organization's processes and practices. The company primarily focuses on collaborative learning in which employees share their knowledge and skills with their peers through a social community. KTC uses this collaborative learning through interactive working processes, such as

knowledge sharing within a mission-based team and a specific learning program titled “KTC Knowledge Sharing.” These learning activities are delivered via face-to-face and online media (i.e., KTC Mind Intranet) communications. Various employees acquire knowledge from each other when they are placed collectively in their communities.

Creativity and innovation are facilitated by a culture of the learning organization [10] and knowledge management [44]. This culture requires an alignment of organizational policies, procedures, and practices that foster a dynamic interaction of individuals, groups, and an organization that creates knowledge.

2.5.2. Role of HRD and knowledge management

HRD is a bridge between personal creativity and organizational performance through KTC policies, procedures, and practices. HRD strategically supports KTC’s identity through the development of employee competencies that are aligned with creativity. KTC uses the knowledge-based organization concept to enhance individuals’ competency development and create knowledge sharing within the firm [45]. Consequently, HRD at KTC contributes to innovation through a variety of learning perspectives: active training, social learning, as well as coaching and mentoring.

KTC facilitates many active training programs to enhance employees’ competence through dynamic learning. The firm provides classroom training and e-learning programs to develop core, functional, and managerial competencies for its employees. These programs are designed with regard to a dynamic of learning activities and a degree of learners’ participation. For example, the HR function implemented a grooming, acting, and voice training program for call center representatives to change their attitudes and make them aware that voice and facial expressions affect their performance when they talk with their clients on the phone [45]. The trainers designed a fun and relaxing environment through demonstration, practice, and a singing contest. KTC applied an aesthetic concept to design fun and dynamic training to develop individuals’ creativity as well as to enhance morale and work engagement.

Social learning is about learning from others. The most recognized KTC social learning program is “KTC Knowledge Sharing.” This program has succeeded with a large number of participants [46]. KTC employees were invited to be speakers who share their knowledge regarding their specialized areas. The knowledge shared focuses not only on the business-related content but also on the non-related business content (e.g., mind-map writing, health and safety, and fashion).

At KTC, coaching and mentoring are used as informal learning practices, not only to develop individuals’ work skills, but also to help them in career and personal enhancement. The former CEO, Niwatt Chitalarn, believed that the most important responsibility in managing his employees was to build a leadership team at KTC [47]. His management philosophy was “my control and your control” by performing as a captain pilot who coaches co-pilots. A captain pilot must function as a leader to provide direction and coordination for his crew. At the right time, a captain pilot should allow co-pilots to make a decision. He believed that a leader had a responsibility, not only to oversee an organization’s performance, but also to develop

the leadership team. In consistency with the previous CEO's philosophy, the current CEO, Srimongkol, coaches his executive teams by asking opinions, giving suggestions, then monitoring their performance, and providing feedback on their actions [45].

Under the knowledge-based organization concept, KTC focuses on learning and development to enhance individuals' capabilities and create practical knowledge sharing within the organization [46]. The firm creates a climate of team learning to move toward its corporate goals.

2.5.3. Summary

KTC uses a dynamic workplace approach in unleashing individuals' creativities in order to update its corporate identity to one that is more vibrant and creative. Senior leadership at KTC assumes that organizational creativity and innovation rely on learning. The knowledge, experiences, and cultural familiarity that each individual employee embodies can be delivered through social learning. The company creates and sustains a creative and innovative culture through leadership and management activities by leveraging actions across the organization. HRD at KTC encourages employees to improve their work through a lively learning environment and a climate of team work and knowledge sharing.

3. Conclusions

Throughout the chapter, examples were provided of organizations that are considered to be innovative. The conclusion of the chapter focuses on specifying commonalities between innovative organizations. We believe themes emerge in the five profiles highlighting linkages between HRD, KM, and innovation. The identification of similar practices and processes may not make it easier for organizations to be innovative, but it does facilitate understanding by practitioners and researchers of some organizational antecedents necessary for innovation to flourish.

We hope this chapter also accomplishes a secondary goal to solidify and clarify where the presence of HRD together with KM establishes conditions necessary for innovation. HRD looks to develop and unleash human expertise and creativity with its focus on career development, training, and organizational development. HRD at these five cases contribute to facilitating a learning culture, providing a broad spectrum of learning and development (L&D) opportunities, and providing employees a broad spectrum of opportunities and encouraging diversity of thought and new ideas. On the other hand, KM focuses on the development of communities of practices, organizational knowledge sharing through lesson learned process, and the utilization of technology to create infrastructure for storing and sharing expertise and best practices. These KM processes facilitate and sustain individual and collective activities to help manage the flow of knowledge (to acquire, create, store, share, use, and assess) throughout the organization. When and where there is expertise and creativity coupled with methods of harnessing, sharing, and growing knowledge and ideas, we believe an organizational environment or culture can exist for innovation. **Figure 1** captures the relation between HRD, KM, and innovative organization.

3.1. Themes of innovative organizations

Several themes emerged from examination of the five company profiles, which are depicted in **Figure 1**. The themes represent facets of organizing that enable the generation and sharing of new knowledge that relates to improved organizational performance. The themes are matched to the profiles of the five companies shown in **Table 2**.

3.1.1. Vision and core values

Many organizations begin with their vision statement as a starting point to motivate organizational performance. In their vision statements, Praxair and FMC Technologies insist on the long-term view of the organization as one of the global preeminence—a key to organizational sustainability. Core values occupy a supporting role in an organization's vision. With KTC its value-based perspective initiates the development of the resulting learning climate.

3.1.2. Autonomy

While organizational leadership may seem to exert control over its business, technology, and products, each organization demonstrates times when internal self-sufficiency provided flexibility for the organization [48]. Flexibility and agility are what allow organizational systems to

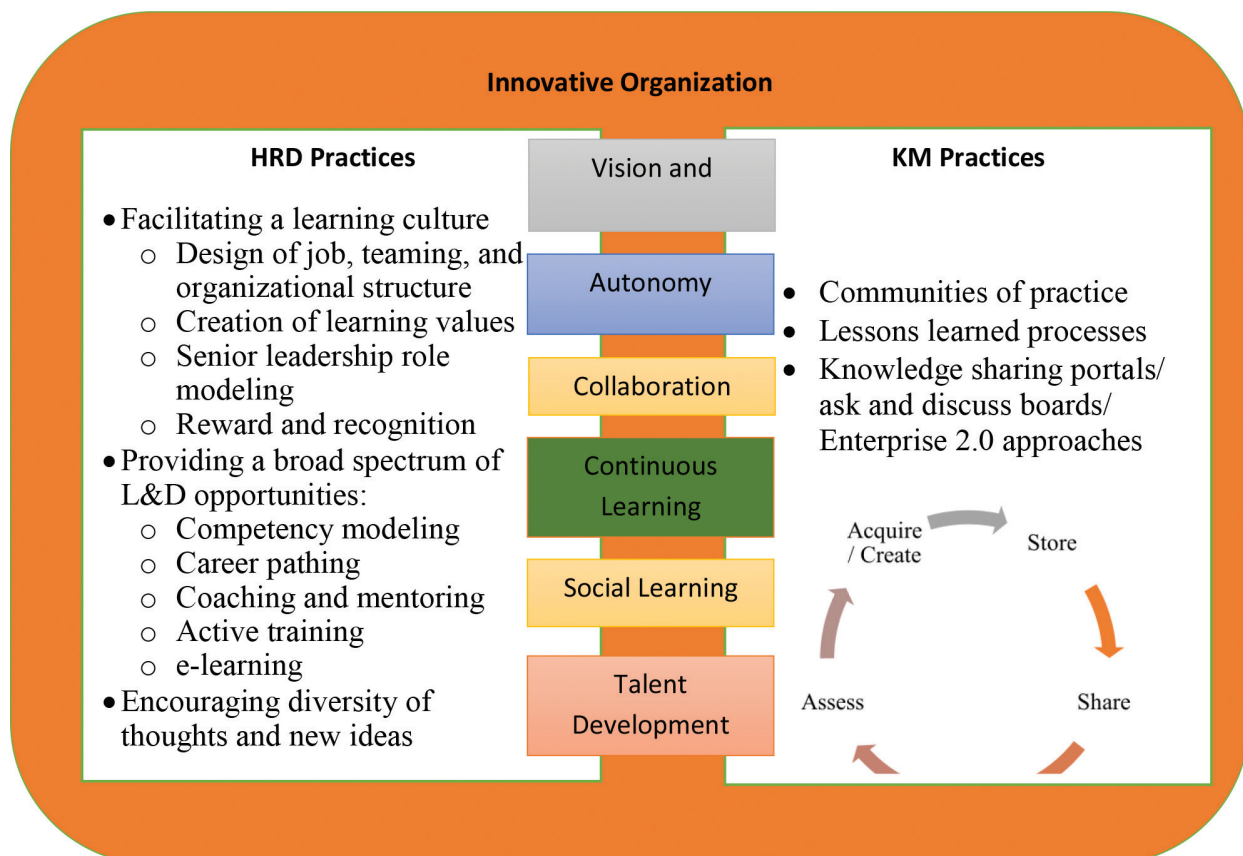


Figure 1. Relationship between HRD and KM practices.

	Praxair	Air Liquide	Rockwell Collins	FMC Technologies Inc.	Krungthai Card PCL.
Vision & core values in daily life	Make the planet more productive	Invent, design, produce high quality solutions for customers and patients	Establish a culture that recognizes inquiry, feedback, and creative thinking	Organizational focus on living the core values	Alignment of corporate policies and practices to enhance employee competency and organization culture
Autonomy	<div><div>1. Business-unit level autonomy flattens the hierarchy</div><div>2. Flexible job design</div></div>		Employees empowered to seek solutions	Team-based problem solving and solution implementation	
Collaboration	Communities of practice	Communities of practice	<div><div>1. Communities of practice;</div><div>2. Institutionalized cross-functional training</div></div>	Communities of practice for each business unit, and department	<div><div>3. Collaborative learning environment;</div><div>4. Team-based knowledge sharing</div></div>
Continuous learning	Simulation-based learning for at all career stages	Focus on continuous learning of succession planning	<div><div>1. Company-based Wikipedia</div><div>2. Formalized lesson-learned processes</div></div>	Employee-focused quarterly communication	Leader-directed corporate culture
Social learning	Rapid development of new hires			<div><div>1. International centers of excellence</div><div>2. New hires integrated socially through online and face to face platforms</div></div>	Engagement-based learning
Talent development	<div><div>1. Engage HR for next generation leadership, talent acquisition, and business integration;</div><div>2. Women mentoring other women;</div><div>3. Mid-career talent development</div></div>	<div><div>1. Technical career paths;</div><div>2. Mentoring & coaching;</div><div>3. Early & mid-career talent development</div></div>	Corporate university	<div><div>1. Corporate university</div><div>2. Women's leadership development program</div></div>	Coaching & mentoring

Table 2. Company findings mapped to conceptual model.

adapt quickly within their markets and ever-changing business environments. Job autonomy and the self-rule provided in the communities of practice are examples of internal self-governance.

3.1.3. Collaboration

Across each of the companies profiled in this chapter, collaboration in team learning enhances competence by allowing employees to learn from one another. An effective KM system supports the collaborative learning.

3.1.4. Continuous learning

Within the communities of practice, constant dialogue by employees results in continuous new learning with processes improving and adaption occurring.

3.1.5. Social learning

As organizations are largely social systems, learning within their communities reinforces desired knowledge and behavior. These communities reflect learning and collaboration. Rockwell Collins and FMC Technologies communities of practice use technology to share knowledge across their internal teams.

3.1.6. Talent development

Whether the need for talent is within the technical sphere, such as with Air Liquide, Rockwell Collins, and Praxair, or in the leadership area, such as with FMC Technologies, internal programs whose focus is to hone specific competencies identify and guide both expertise and knowledge sharing within the organization. Early, middle, and end of career development supports internal career development and the life cycle of the organization. As talent and the organization mature, the needs of both individual and company are met.

Author details

Michael Beyerlein^{1*†}, Rachele Collins^{2†}, Shinhee Jeong^{1†}, Christi Phillips^{3†}, Suravee Sunalai^{4†} and Lei Xie^{1†}

*Address all correspondence to: beyerlein@tamu.edu

1 College Station, Texas A&M University, USA

2 American Productivity and Quality Center, Houston, USA

3 CHI St. Luke's Health, Houston, USA

4 Dhurakij Pundit University, Bangkok, Thailand

† These authors contributed equally

References

- [1] Nguyen TNQ, Neck PE, Nguyen TH. The critical role of knowledge management in achieving and sustaining organizational competitive advantage. *International Business Research*. 2009;2. DOI: 10.5171/2010.322246. <http://ro.uow.edu.au/commpapers/1721/>
- [2] Spender JC. Knowledge management: Origins, history, and development. In: *Advances in Knowledge Management*. Springer International Publishing, New York, NY; 2015. pp. 3-23
- [3] Hughes C, Gosney MW. *The History of Human Resource Development: Understanding the Unexplored Philosophies, Theories, and Methodologies*. Springer, New York, NY; 2016
- [4] Wang Z, Wang N. Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*. 2012;39:8899-8908. DOI:10.1016/j.eswa.2012.02.017 DOI:10.1016/j.eswa.2012.02.017#doilink
- [5] Ishak NB, Eze UC, Ling LS. Integrating knowledge management and human resource management for sustainable performance. *Journal of Organizational Knowledge Management*. 2010;2010:1-13. DOI:10.5171/2010.322246. <http://ibimapublishing.com/articles/JOKM/2010/322246/>
- [6] Kastle T. The Problem of Defining Innovation [Internet]. 2010. Available from: <http://timkastle.org/blog/2010/08/an-innovation-definition>
- [7] Crossan M, Apaydin M. A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*. 2010;47(6):1154-1191. DOI: 10.1111/j.1467-6486.2009.00880.x
- [8] Harkema S. A complex adaptive perspective on learning within innovation projects. *The Learning Organization*. 2003;10:340-346. doi:10.1108/09696470310497177
- [9] Gibb S, Waight CL. Connecting HRD and creativity: From fragmentary insights to strategic significance. *Advances in Developing Human Resources*. 2005;7:271-286. DOI: 10.1177/1523422305274530
- [10] McLean LD. Organizational culture's influence on creativity and innovation: A review of the literature and implications for human resource development. *Advances in Developing Human Resources*. 2005;7:226-246. DOI: 10.1177/1523422305274528
- [11] Taylor MA, Callahan JL. Bringing creativity into being: Underlying assumptions that influence methods of studying organizational creativity. *Advances in Developing Human Resources*. 2005;7:247-270. DOI: 10.1177/1523422305274529
- [12] Sunalai S. *Knowledge Management Systems in Higher Education Institutions in Thailand: A Holistic Model of Enablers, Processes, and Outcomes [dissertation]*. Texas A&M University; 2015
- [13] Nonaka I, Takeuchi H. Knowledge creation and dialectics. In: Takeuchi H, Nonaka I, editors. *Hitotsubashi on Knowledge Management*. Singapore: John Wiley & Sons (Asia); 2004. pp. 1-28

- [14] Davenport TH, Prusak L. *Working Knowledge: How Organizations Manage What They Know*. Boston: Harvard Business School Press; 1998
- [15] Sunalai S, Beyerlein M. Exploring knowledge management in higher education institutions: Processes, influences, and outcomes. *Academy of Educational Leadership Journal*. 2015;**19**:289-308. Available from: <http://search.proquest.com/docview/1768629497?accountid=44522>
- [16] Callahan MHW. *Case study of an advanced technology business incubator as a learning environment [dissertation]*. The University of Georgia; 1999
- [17] Marsick VJ, Watkins K. *Informal and Incidental Learning in the Workplace*. London: Routledge; 1990
- [18] Marsick VJ, Watkins KE, Callahan MW, Volpe M. Reviewing Theory and Research on Informal and Incidental Learning [Internet]. 2006. Available from: <http://eric.ed.gov/?id=ED492754>
- [19] Sherif K, Xing B. Adaptive processes for knowledge creation in complex systems: The case of a global IT consulting firm. *Information & Management*. 2006;**43**:530-540. DOI: 10.1016/j.im.2005.12.003
- [20] Forbes. *How We Rank the World's Most Innovative Companies 2013* [Internet]. 2013. Available from: <http://www.forbes.com/sites/innovatorsdna/2013/08/14/how-we-rank-the-worlds-most-innovative-companies-2013/>
- [21] Achievers. *50 Most Engaged Workplaces™ in North America for 2016* [Internet]. 2016. Available from: <http://www.achievers.com/engaged/winners/2016>
- [22] Angel S. *2015 Annual Report Shareholders Letter* [Internet]. 2016. Available from: <http://www.praxair.com/investor-relations/2015-annual-report-shareholders-letter>
- [23] Harris BR, Huselid MA, Becker BE. Strategic human resource management at Praxair. *Human Resource Management*. 1999;**38**:315-320. DOI: 10.1002/(SICI)1099-050X(199924)38:4<315
- [24] Praxair. *Values and Vision* [Internet]. 2016. Available from: <http://www.praxair.com/our-company/vision-and-values>
- [25] Heller M. *Developing blended executives* [Internet]. 2014. Available from: <http://www.cio.com/article/2453321/cio-role/developing-blended-executives/cio-role/cio-role/developing-blended-executives.html>
- [26] Overby S. *HR Departments Invaded by Data Scientists* [Internet]. 2013. Available from: <http://www.cio.com/article/2383195/business-intelligence/hr-departments-invaded-by-data-scientists.html>
- [27] Carter L, Ulrich D, Goldsmith M, editors. *Best Practices in Leadership Development and Organization Change: How the Best Companies Ensure Meaningful Change and Sustainable Leadership*. Wiley, New York, NY; 2005

- [28] Bourgeois T, Jordan B, Kuberka K, Nestle M, Vasquez A. Praxair Inc. Case Study. In: APQC 2015 Knowledge Management Conference. Center holds an annual conference; 2015; Houston, TX. <https://www.apqc.org/apqcs-2015-knowledge-management-conference>
- [29] Chief Learning Officer. How Praxair Grooms Tech Talent for Business Roles [Internet]. 2013. Available from: <http://www.clomedia.com/2013/11/22/how-praxair-grooms-tech-talent-for-business-roles/> [Accessed: November 22, 2013]
- [30] Bourgeois T. Using Video on Demand and Ask an Expert to identify and develop experts. APQC Webinar. [Internet]. 2015. Available from: <https://sites.google.com/a/ki-network.org/announcements-site/announcements/1441109740023>
- [31] APQC. Enabling knowledge capture and transfer with video and Ask-An-Expert systems at Praxair. Session Overview. In: APQC 2015 Knowledge Management Conference. Center holds an annual conference; 2015; Houston, TX. <https://www.apqc.org/apqcs-2015-knowledge-management-conference>
- [32] Smith M. Product innovation and the growth of the large firm: The case of Air Liquide, 1902-1930. *Essays in Economic & Business History*; 1999;17:49-61. <http://ebhsoc.org/journal/index.php/journal/issue/view/13> [Accessed: June 30, 2017]
- [33] Hoovers. Air Liquide Company Information [Internet]. 2016. Available from: www.hoovers.com
- [34] APQC. Knowledge Management at Rockwell Collins [Internet]. 2012. Available from: <http://www.apqc.org/knowledge-base/documents/knowledge-management-rockwell-collins> [Accessed: October 12, 2012]
- [35] APQC. Knowledge Management at Rockwell Collins: Accelerate Knowledge. Create Value [Internet]. 2011. Available from: <http://www.apqc.org/knowledge-base/documents/knowledge-management-rockwell-collins-accelerate-knowledge-create-value> [Accessed: July 03, 2011]
- [36] Jorgensen R. Creating an environment for knowledge sharing: corporate knowledge sharing at Rockwell Collins. *International Council on Systems Engineering*. 2011;14:22-25. DOI: 10.1002/inst.201114125
- [37] Bhandari R, Wendt T. Using agile techniques to enable the flow of knowledge at Rockwell Collins. In: APQC 2016 Knowledge Management Conference. Center holds an annual conference.; March 2016; Houston, TX. <https://www.apqc.org/apqcs-2016-knowledge-management-conference>
- [38] Rockwell Collins. 2012 Corporate Responsibility Report Executive Summary [Internet]. 2012. Available from: http://www.rockwellcollins.com/Our_Company/~media/FCD0D1A8174B446D8E257C56706EF7F0.ashx
- [39] Rockwell Collins. 2014 Rockwell Collins Annual Report [Internet]. 2014. Available from: http://www3.rockwellcollins.com/annualreport/2014/_images/global/RockwellCollins2014.pdf

- [40] Purington C, Butler C, Gale, S F. Built to Learn: The Inside Story of How Rockwell Collins Became a True Learning Organization. New York: AMACOM, American Management Association; 2003
- [41] Foss NJ, Husted K, Michailova S. Governing knowledge sharing in organizations: Levels of analysis, governance mechanisms, and research directions. *Journal of Management Studies*. 2010;**47**:455-482. DOI: 10.1111/j.1467-6486.2009.00870.x
- [42] Phillips CA. Role of HRD in innovative organizations – FMC Technologies Inc. Poster In: the 2014 Academy of Human Resource Development Conference; 2014; Houston, TX. http://www.ahrd.org/?13_americas_archive#ahrd14
- [43] Thongsuk P. Creative organization. In: HROD Talk; The National Institute of Development Administration, Bangkok, Thailand; April 2009
- [44] Loewenberger P. The role of HRD in stimulating, supporting, and sustaining creativity and innovation. *Human Resource Development Review*. 2013;**12**:422-455. DOI: 10.1177/1534484313494088
- [45] Adisornmongkol K. Rathian Srimongkol Writes the KTC Story [Internet]. 2012. Available from: <http://www.brandage.com> [Accessed: April 01, 2012]
- [46] Krungthai Card. KTC Annual Report 2014. Bangkok: 2015. https://www.ktc.co.th/KTCBook/AnnualReport/2015_EN.pdf
- [47] Chiamrotchananon W. Leadership Team @ KTC [Internet]. 2008. Available from: <http://www.bangkokbiznews.com> [Accessed: July 23, 2008]
- [48] Pasmore B. Leading Continuous Change: Navigating Churn in the Real World. Berrett-Koehler Publishers, San Francisco: CA; 2015

