



General management of innovation: lessons from the Shaker community

John F. Preble

*Lerner College of Business & Economics, University of Delaware, Newark,
Delaware, USA, and*

Richard C. Hoffman

Perdue School of Business, Salisbury University, Salisbury, Maryland, USA

Abstract

Purpose – The purpose of this study is to employ the concepts of the general management of innovation to help explain the extraordinary inventiveness of the Shaker religious community.

Design/methodology/approach – Utilizing historical accounts of Shaker philosophy and practice, the paper examines Shaker innovativeness through the lens of the general management of innovation in order to develop a historical interpretation of innovation within the Shaker community.

Findings – It was demonstrated that Shaker society possessed a large number of the organizational characteristics, management practices, and values, which have subsequently been found to be positively related to innovative behaviors in modern institutions.

Research limitations/implications – Future research should examine in even greater depth specific values, structure, and practices of Shaker communities as well as focusing on key concepts in other fields such as product, operations, or R&D management to yield additional insights into the management of innovation within organizations.

Practical implications – The paper discusses several managerial actions derived from an examination of Shaker practices related to the general management of innovation that are relevant for contemporary organizations.

Originality/value – This study uses the extant history of Shaker society to examine, illustrate, and help explain contemporary general management of innovation. This exposition should help inform organizations interested in improving their efforts at spurring successful innovation.

Keywords General management of innovation, Shaker society, Management history, Total quality management, Learning organizations, Knowledge creation, Innovation, Creative thinking, Modern history

Paper type General review

Introduction

The Shaker community in the USA has been the source of an unparalleled number of inventions and innovations during their peak years. While there are certainly some religious, economic, and cultural reasons for this innovativeness among the Shakers, the purpose of this study is to use concepts of modern innovation management to provide an alternative explanation of Shaker inventiveness. Our purpose is twofold, first, to provide some additional reasons why the Shakers were so innovative and, secondly, to demonstrate that principles of modern management can be seen in earlier societies; they simply were not clearly articulated at the time. In a sense while history certainly informs the present, ideas and perspectives of the present may provide alternative explanations and perspectives for understanding the past.



The late David M. Potter, a renowned American historian and Yale University professor, has argued that the closely integrated culture of the Shaker society provides unusual opportunities for the study of a full-blown culture in microcosm. The Shakers “[...] developed a fully articulated and homogeneous culture, with a value-system and a way of life which was expressed not only in religion, but was reflected in their unique social organization, their economic system, and their educational pattern” (found in Andrews and Andrews, 1974, p. 7). In a similar vein, but relating more directly to management, Carson *et al.* (2000, p. 38) observe that “[...] it is difficult to overlook the value and insights that historical religious movements may offer to modern-day management practitioners and academics”. Further support for studying the Shakers is offered by Carson and Carson (1998, p. 39) when they contend that one of the purposes of management history research is to, “[...] reveal examples of how current research efforts are aimed at ‘rediscovering’ what has previously been discovered”.

With this backdrop, we believe that an investigation of the underpinnings of the Shaker innovative culture will be fruitful. A careful historical investigation of the Shakers and their work practices provides considerable insight into the general management of innovation that is also relevant to contemporary organizations.

The application of historical analyses remains an underutilized approach in management and organization studies (Clark and Rowlinson, 2004). Recent examples include the use of project management principles to explain building projects in ancient China (Pheng, 2007) and the examination of the creation of knowledge by medieval Celtic monks as a way to shed light on the discourse of modern knowledge management (McGrath, 2007). Thus, not only are there increased efforts to combine modern management processes with the study of past practices, but its application to religious groups also has some precedence. We adopt Skocpol’s (1984) method of using current concepts, the general management of innovations (versus operations or R&D management perspectives) in this case, to develop a historical interpretation of innovation within the Shaker community. Our intent is to increase the understanding of innovation among the Shakers by using innovation concepts that are familiar in the present. While this approach does not meet the normal scientific standards of causality and generalization, its purpose is not only to provide an alternative explanation of the past, but also to use existing history to examine and illustrate contemporary concepts. Our approach relies exclusively on secondary data and the interpretation of the past. By contrasting this data with modern management concepts, we try to develop interpretations that are relevant to the present.

We begin by providing a brief history of Shaker society. This will be followed, by documenting actual inventions, and improvements to products, and processes, that the Shakers are credited with. We then contrast Shaker innovative activity with concepts of the general management of innovations drawn primarily from the literatures of the fields of organization theory and strategic management. The paper concludes with what we believe are the key management lessons that can be drawn from conducting this historical examination of the Shakers’ exemplary innovative culture.

A brief history of the Shakers

The Shakers are considered to be one of the most successful and enduring religious and communitarian groups in American history, lasting from the late eighteenth into the twenty-first century (Harrington, 2005). The origin of the Shaker Society stems from a

sect of radical English Quakers (founded in 1747 by the Wardleys) who had adopted the French Camisards' ritual practices of shaking, shouting, dancing, whirling, and singing in tongues (Encyclopaedia Britannica, 2007). These demonstrations of shaking and trembling were believed to be caused by one's sins being purged from the body by the power of the Holy Spirit. In this way, the religious worshipper, was thought to be purified (Joy, 1960).

In 1758, Ann Lee, an illiterate textile worker from Manchester, England, converted to the "Shaking Quakers" (Encyclopaedia Britannica, 2007). Lee was subsequently persecuted and imprisoned for her participation in noisy worship services on the Sabbath. While imprisoned, Ann experienced revelations indicating that she was the female aspect of God's dual nature (i.e. God the Father-Mother), the second Incarnation of Christ, and that in order to follow in Christ's path (sexual lust impeded Christ's work) believers must practice celibacy. In 1771 Ann Lee splintered from the English Shakers, founding a new religious sect based on the previous revelations. This sect was officially named the United Society of Believers in Christ's Second Appearing (for short, Shakers) and "Mother Ann" became its official leader. However, these new beliefs clashed with accepted Christian ideology, leading to even more persecution. Around this time, Ann Lee had another revelation where she was charged to establish a millennial church in the New World (i.e. the USA). She and eight followers subsequently immigrated to the US in 1774. They finally settled in 1776 at a communal farm in Watervliet, New York, where they struggled to survive and received few converts. Following the death of Ann Lee in September, 1784 (Duffield, 2000), James Whittaker (1751-1787), the last of the original English leaders led the Shakers from 1784 to 1787, calling for, "converts to 'gather', and live and work in the community" (Harrington, 2005, p. 236). The Shaker church was then led by Joseph Meacham (1742-1796), a former Baptist minister and Lucy Wright (1760-1821) (Wikipedia, 2006). This was the Shakers' first Native American liturgical team (Duffield, 2000). Meacham and Wright worked out the distinctive pattern of social organization consisting of celibate communities of men and women living together (but separately) in dormitory-style houses and holding all property in common (Encyclopaedia Britannica, 2007). Due to the dual nature of God, sexual equality was practiced in Shaker communities, and this meant that brothers and sisters had equal privileges and responsibilities. The first Shaker community was established in New Lebanon, NY, and became the Parent Ministry for spiritual and commercial leadership (Horgan, 1982; Melton, 1992). From this base, the Shakers sought converts and set up 19 communities (villages) in New England, Kentucky, Ohio, and Indiana. As the Shakers evolved the group changed its philosophy somewhat under each new set of leaders and its theology was also adjusted (Shakers: The United Society of Believers, 2001). However, certain core beliefs and practices remained at the center of Shaker society.

The Shakers realized early on that the goals of separation from "The World" and self-sufficiency would require the development of an economic system efficient enough to maintain their institutions and achieve their ideals (Emerich and Benning, 1983). Although the Shakers were nearly self-sufficient, not all goods could be produced internally and raw materials frequently needed to be acquired externally. Therefore, it was reasoned that survival depended on trade, even at the risk of some worldly contamination. The Shakers began logically by first producing goods to satisfy their own needs, but they rapidly became known externally for their inventiveness and

quality craftsmanship. As a consequence, their superior products provided a basis for their becoming aggressive entrepreneurs, launching industry after industry (Swank, 2003, p. 3). To illustrate, the Shakers are credited with inventing the more efficient flat broom. They then turned the making of brooms and brushes into a very successful enterprise. The Shakers were pioneers in the growing, packaging, and marketing of a wide variety of garden seeds and in the preparation of herbal medicines. They demonstrated their renowned craftsmanship in the production of numerous high quality products made with wood. For example, they manufactured and sold to the outside world oval boxes, woodenwares, and furniture, with chairs evolving into quite a large-scale industry. The Shakers also excelled in making textiles where they produced, for internal and external consumption, such items as cloaks and bonnets. Thus, the Shakers' successful economic system allowed them to pursue their religious ideals for decades while simultaneously adjusting to the practical realities of the marketplace needed for survival.

At its peak in 1860, the total Shaker membership was estimated to be 6,000 (Dixon, 1867). During this period, Shaker communities became recognized for their model farms, which were orderly, efficient, and prosperous. Consequently, these idyllic villages also were quite effective in attracting converts to the fold. However, from the 1860s forward membership in Shaker society started to decline and few new villages were established and many started to close. Duffield (2000) suggests several possible attributions for the decline: "backsliding" of the young members; less religious zeal than the founders; ineffectual leadership; and the advance of modern machinery (i.e. industrialization). Today only a few members remain at one working village at Sabbathday Lake, Maine. However, interest in this successful Utopian experiment, which lasted more than 200 years, appears to be at an all time high. Villages have been turned into museums, attracting thousands of visitors each year. Many Shaker products have become "collectables" that appreciate in value.

Shaker inventions and improvements

Observers of Shaker society indicate that Shaker inventiveness is nearly legendary, and scholars of the Shaker community are universal in making a similar assessment. White and Taylor (1904, p. 311) note that, "From statistics outside the Order, the statement has been made that more useful inventions have originated among Shakers than any other people of the same number". Similarly, Betts (1989) calculated that there were only 6,000 Shakers in all their communities at their peak, but that they were far more inventive, on a per capita basis, than society as a whole. Duffield (2000, p. 70) indicates that Shakers, "[. . .] have produced a very long list of labor-saving inventions – not to mention improvements to existing devices [. . .]". Recently, Carson *et al.* (2000, p. 39) observed that, "The list of inventions and innovations originating with the Shakers is lengthy and impressive". An even stronger claim has been made by Randolph and O'Keefe-Bolick (1990, p. 92) alleging that "no group has ever equaled their astonishing inventiveness [. . .]".

Tables I and II are provided to illustrate some of the inventions and improvements to tools, products, and processes that the Shakers' are credited with. Since Shaker economies were focused on agriculture, livestock breeding, and land-based businesses (Swank, 2003) the innovations depicted here largely reflect this concentration.

The Shakers' believed that any invention that they developed should be shared with the whole world based on the Golden Rule. Patents grant exclusive and exclusionary or

Patented invention	Patented improvement
1810 Churn	1832 "Tilter" for chairs
1829 Atmospheric steam-engine	1849 Hydro-extractor
1831 Washing machine and churn	1851 In machines for sorting
1834 Wheel mill	Broom corn
1836 Truss for hernia	1853 Mop-heads
1837 Loom-heddle and harness	1856 Cartridges
1837 Winnowing, Cleaning and Separating Machine	1856 Brace
1846 Temple for looms, self-acting	1858 First mechanical washing machine ("wash mill")
1851 Machine for stripping seed from broom corn	1859 Bit and brace
1859 Cast-iron fence post	1859 Fly-trap
1861 Plough	1860 Shingle machine
1864 Pea-sheller	1862 Land-leveler
1864 Cider mill	1864 Water wheel (with controlling gate)
1864 Water wheel	1866 Method for preserving and drying green corn-on-the-cob
1864 Wind wheel	1872 Cord-clamp for windows – "Shaker sash balance"
1865 Harvesting machine	1875 In green corn cutters
1866 Grain separator	1901 "Long cloaks"
1866 Combined seeder and cultivator	
1867 Double shovel plough	
1869 Chimney caps	
1871 "Toneometer"	
1872 Folding stereoscope	
1876 Machine for dumping wagons	

Table I.
Selected patents held by Shakers

Sources: Andrews and Andrews (1974); Richmond (1977)

monopoly rights to the patentee (Wikipedia, 2007) and were, thus, objectionable generally to Shaker religious principles. However, the Shakers' found out through experience that patents might be the only way to protect their economic rights (Andrews and Andrews, 1974). For example, the circular saw was invented by Sister Tabitha Babbit in 1910, but was subsequently patented in the USA by two French inventors in 1916 (Betts, 1989). Thus, as Table I reveals, the Shakers' did end up patenting nearly 40 inventions and improvements during the 1800s. However, in Richmond's (1977, p. 167) examination of the US patent records, she found that the number of Shaker patents may be under estimated, "Nearly 100 other patents described in the patent records appear to have been granted to Shaker inventions, but they have been omitted here because it has not been possible to establish the patentee's Shaker connection".

Table II presents an extensive, but far from exhaustive, list of Shaker inventions and improvements that were not patented, but are frequently attributed as being developed by Shaker ingenuity.

Motivation to innovate

The reasons that Shakers' were highly motivated to innovate are complex and stem from both Shaker religious philosophy and its practice. Viewing "The World" as too materialistic (not spiritual enough), the Shakers' set themselves up as separatists,

Dated	Undated
1793 Machine for setting teeth in hand cards	Cheese press
1798 Flat broom	Wooden wall pegs
180- Machine for pricking leather in wool cards	Metal ink pen (nib)
1808 First electrical machine	Built-in bed
1812 Removable window sash	Transom window over-doors
1813 Circular saw and circular “buzz”	Cut nail
1815 First packaged-seed business	Screw propeller
1816 Hair caps	“Babbit Metal”
1819 Steel candlesticks	Rotary or revolving harrow
1822 Fire engine and hose cart	Automatic springs
1828 Machinery for matching boards (tongue and groove)	Fertilizing machine
1834 Instrument for cutting spectacle glass	Clothespin
1837 Silk reeling machine	Horse collar
1843 Cultivator	Shaker bonnets
1844 Improved board planning machine	Apple parer
1846 Permanent press and water-repellent cloth	Botanical medical practice
1853 Cooper vacuum pan	(Roots, herbs, vegetable extracts)
1861 Making capsules of copaiva	One-horse wagon
1876 Revolving baking oven	Sulfur match
	Double rolling pin

Sources: Andrews and Andrews (1974); Betts (1989); Randolf and O’Keefe-Bolick (1990); White and Taylor (1904)

Table II.
Shaker inventions and
improvements (not
patented)

choosing to live in their own Shaker communities, which aspired to be self-sufficient. Their, “[. . .] proclaimed purpose was to set an example of how men and women, in a voluntary association, should work and worship, in peace, humility, order, and brotherhood” (Andrews and Andrews, 1974, p. 7). With the Shaker villages nearly isolated, they needed to find ways to become self-sufficient and economically viable. Stein (1992, p. 303) contends that the Shakers’ had to adopt an aggressive work ethic to accomplish these ends and that their inventiveness was an unintentional by-product of this ethic.

While Shakerism is a deep and highly spiritual movement (Williams, 1957) in practice it was not a contemplative religious society (Swank, 2003, p. 3). Instead, “its driving force was to appear to such a vigorous degree in the application of the practical” (Williams, 1957, p. 1). All work was done as “consecrated labor” (i.e. labor in the service of God) and was performed with extra care and attentiveness (Carson *et al.*, 2000, p. 40). For Shakers, “Work well done was considered a form of worship” (Hudson, 1992, p. 28). But “consecrated labor” did not preclude and perhaps even encouraged “consecrated ingenuity” (Williams, 1957). As one Shaker Eldress pointed out, a Shaker “[. . .] sees no virtue nor economy in hard labor when the consecrated brain can work out an easier method” (Neal, 1974, p. 50). Similarly, White and Taylor (1904, p. 310) comment that, “There is no quickener to brain and hand like heart at peace, a conscience clear and a sense bright with the joy of holy living [. . .]”. Thus, Shaker spirituality, their work ethic, and emphasis on the practical all seemed to reinforce one another in creating an intense desire to innovate.

The Shaker communal structure meant that there was no individual striving for material gain (i.e. no profit motive), no wages, no hours and the like and any surplus was reinvested in the community or given to charity (Andrews and Andrews, 1974, p. 8). Thus, the desire to experiment (and perhaps devise an improvement or invention) was stimulated by the fact that the workers could benefit directly from successes based on their own talents (Andrews, 1953, p. 114). Inventions like the circular saw by Sister Tabitha Babbit reduced the labor required for the same level of operations from 30 men to one man and a boy. Hence, inventions and improvements could both reduce the amount of labor required and the effort needed to complete a task, giving the Shakers more time to pursue religious (Randolph and O'Keefe Bolick, 1990) and intellectual pursuits (Andrews, 1953).

Oversight of Shaker activities by the Elders was also a factor in motivating the level of innovative initiative. As reported in Andrews and Andrews (1974, p. 152) early on (around 1802) the Shakers' were cautious about introducing "conveniences" and instead focused more on achieving religious or spiritual ends among the fold. However, later, as the economy expanded, they started to welcome improvements. Elder Rufus Bishop (May 10, 1850) supported this trend, but with one major caveat, "We have a right to use or improve the Inventions of man so far as is useful and necessary but not to Vain Glory or anything superfluous [. . .]". Given the Elders approval the Shakers' were free to develop a culture of innovation. With basic beliefs handed down by Mother Ann Lee, like, "Hands to work and hearts to God" and "You must not waste one moment in time, for you have none to spare" (i.e. waste not, want not) the Shakers' beliefs motivated them to be creative (Randolph and O'Keefe-Bolick, 1990, p. 79). Shakers' were encouraged to do a job as quickly (i.e. continuously search for methods/tools to be more productive and efficient) and as well (i.e. high quality) as you can. Use everything and find ways to avoid waste (Randolph and O'Keefe-Bolick, 1990).

All of the previous factors led the Shakers to be highly motivated in the pursuit of finding innovations that would save time, materials, arduous labor, and thus facilitate the spiritual pursuit of perfection. Tables I and II provide support for and are illustrative of the kind of success they had as inventors.

Innovation management and Shaker inventiveness

While an examination of Shaker society and how it was organized to foster innovation may yield insights for today's managers. Current management theories may also be used to help explain the innovativeness of the Shaker movement as described previously. In this section we draw on contemporary theories of the general management of innovation to help explain why the Shakers were so innovative as a society. In so doing we are able reveal the applicability of their practices for managers today.

The field of innovation management is quite broad and draws from a number of disciplines including product management in the marketing (e.g. Crawford, 1987), operations/production management (e.g. Ettl, 2000), R&D management (e.g. Jankowski, 1998) organization theory (e.g. Burns and Stalker, 1961; Burgelman, 1984), and strategic management (e.g. Leonard-Barton, 1992; Terziovski, 2010). This study focuses on the general management of innovation. General management is defined as the management of the total enterprise or an autonomous unit or division

(Kotter, 1982). As a result, the perspective is that of top management. Most of the work on general management is based on the fields of organization theory (e.g. 1982) and strategic management (e.g. Andrews, 1987). This perspective is most appropriate for this study as it adopts a broad management approach of the whole organization rather than simply a group of specialists within it. Such an approach allows the researchers to take a wide view of the innovations and practices of the Shaker Community as their database. The use of this focused of theories permits us to develop a more parsimonious exposition of innovation management as practiced by the Shaker community.

At its broadest level, general management of innovation is described as the process of problem solving in the organization (Rogers, 1995) or as all activities used to efficiently implement novel ideas into effective solutions for the market (Drejer, 2002) or the organization. Other theorists have identified some of the key management constructs/principles that appear to affect innovation within organizations. For example, Burns and Stalker (1961) identified organic structures, communication, and career planning for knowledge workers as essential to the management of innovation. Thom (1990) identified the firm's strategy, organization structure, and incentives for innovation as critical to managing innovation while Damanpour (1991) found the critical innovation management dimensions to be structure, managerial characteristics, and technical knowledge. According to Leonard-Barton (1992), innovation management encompasses; specialized knowledge and skills, technical systems, managerial incentives, and values/norms. More recently, studies have further emphasized the importance of having the right corporate culture for innovation (Tellis *et al.*, 2009; Terziovski, 2010).

The literature review of the general management of innovation mentioned previously suggests that the three primary organizational dimensions affecting the management of innovation to include: the organization structure, management systems/practices, and the institution's values and culture. We use each of these as lenses with which to examine and explain the inventiveness of Shaker Society.

Organization structure

The organization's structure refers to the formal arrangements/relationships among members of an institution. The basic task structure within a Shaker community was organized around the tasks to be accomplished. The Shakers' tasks were a function of two key factors. The first was the times and environment (i.e. stage of economic development) that existed during the period in which the Shakers flourished. For example, Swank (2003) characterized the Canterbury (N.H.) Shaker village economy as consisting largely agricultural, livestock breeding, and land-based businesses like the production of seeds, herbal medicines, and wooden wares. The second factor generating and defining tasks was the fact that the Shakers had decided to live separately from "the world", in mostly self-sufficient communities. Thus, numerous skills were needed in order to perform the myriad of tasks associated with achieving the previous goal (Sprigg and Larkin, 1987).

There is considerable body of literature that indicates that structural arrangements both help and hinder innovative processes (e.g. Damanpour, 1991; Kimberly and Evanisko, 1981; Meyer and Goes, 1988). Three structural processes that appear to facilitate innovation within organizational settings include criteria for organizational

membership, an emphasis on smaller organizational units, and authority based on knowledge rather than formal authority or rank.

Membership criteria help form common bonds based on shared knowledge and skills that serve as a basis for membership in an organization. These criteria may also facilitate communication among members due to similar knowledge or interests of the members (e.g. Rogers, 1995). In describing the formation of learned scientific and technological societies of the nineteenth century, Burns and Stalker (1961, p. 25) observed, "Leading minds attracted others of like tastes and pursuits and social circles were formed which proved to [be]... the source of great intellectual activity, as well as, enjoyment". These groups often resulted in a sort of intellectual segregation much like the Shaker colonies. Shakers were drawn to the community by similar beliefs in God and how to live such as the duality of good, celibacy, and pacifism. In addition and more pertinent to innovations, Shakers believed in a communal (sharing) way of living, consecrated labor, wherein, God is revealed in the detail of work and craftsmanship, and a key belief was that of consecrated ingenuity. The Shakers saw no value in hard labor if an easier method could be worked out, and they also believed in being self-sufficient.

Criteria for membership into the Shaker communities included the requisite desire to live according to its tenets and also the need to have a variety of skills and trades that could swiftly be put to task. For example, Mother Ann Lee was a textile worker, her brother William a blacksmith and follower James Whittaker was a weaver. Others included a printer, a wood worker and stonecutter, and a skilled seamstress (Sprigg and Larkin, 1987). However, numerous other occupations would need to be developed, and the Shakers approached this challenge in a systematic manner as discussed subsequently.

These shared beliefs helped foster a community where members shared their knowledge and pooled their skills to grow or make the products the community needed and to work out improvements in both the products and their fabrication as necessity and a common belief in conserving labor dictated. The member criteria that brought Shakers together also facilitated their sharing of knowledge and information, which is key to developing innovations.

Over time core capabilities based on shared knowledge and skills became institutionalized and part of the organization's way of doing things (Leonard-Barton, 1992). During the height of their popularity, Shaker communities become recognized as models of orderly, efficient, and prosperous organizations that produced a large number of labor saving inventions as well as improvements to existing products (see Tables I and II).

Smaller units have been found to be an important setting for innovations (Kimberly and Evanisko, 1981). Many of today's innovative organizations such as 3M Company, Thermos Corp., and W.L. Gore have found that innovation occurs best when there are fewer layers of bureaucracy and when the innovative unit is close to the customer. This suggests that, as the organization gets larger, it needs to divide itself into smaller semi-autonomous units in order to prevent the rigid controls and bureaucracy that accompany growth in size (e.g. Birkinshaw and Mol, 2006; Burgelman, 1984; Burns and Stalker, 1961, Rogers, 1995). Many organizations see the optimal unit size for innovation to be below 400 people (Quinn, 1985).

At their peak there were 19 Shaker communities with a maximum of 6,000 members, which is an average of about 316 members per community. This community size is consistent with unit sizes of a couple of hundred professed by today's innovative corporations (Quinn, 1985; Shipper and Manz, 1998). Furthermore, because self-sufficiency and a continuing search for improving their work were central to the purpose of each Shaker community, these smaller quasi-independent communities were consistent with suggested organization designs for innovativeness. Burgelman (1984) indicates that independent business units are ideal structures for activities that are strategically important to the organization but whose operations are operationally unrelated. Each Shaker Community was essential to the furtherance of Shaker Society, but because each community had to be self-sufficient, they were operationally unrelated to the others. Thus, smaller communities were preferable and may indeed have helped foster their innovativeness.

Knowledge is power in innovative organizations and knowledge creation is commonly found in innovative organizations (Nonaka, 1991). As discussed earlier, McGrath (2007) examined the creation of knowledge by medieval Celtic monks as a way to shed light on the discourse of modern knowledge management. Senge (1990) identified some ways in which organizations can build learning capabilities including personal mastery, shared vision, and team learning. Nonaka (1991) closely examined knowledge-creating Japanese companies to determine distinct organizational characteristics that tended to produce continuous innovation. According to Burns and Stalker (1961), knowledge rather than the traditional hierarchy made an organic form of organization more supportive of innovations; subsequent research (Damanpour, 1991) supports this view. In organic organizations there are more lateral/horizontal than vertical communications (Burns and Stalker, 1961; Tidd, 2001) that facilitate the flow of information and advice among organizational members. Similar to organic organizations, Shaker communities were fairly flat organizations (few levels of hierarchy), wherein, all members shared in ownership and reinvested proceeds back into the community.

Nonaka (1991) views innovation as re-creating the world according to a particular vision or ideal. Learning requires a shared vision (Senge, 1990). Inventing new knowledge is not seen as just the province of Research and Development, instead everyone is a knowledge worker. For the Shakers the shared vision was that work had the clear religious purpose of redemption, with God dwelling in the details of their work and in the quality of their craftsmanship (Burns and Burns, 1988). Thus, consecrated labor and the quest for perfection led the Shakers to produce both high quality products and high levels of innovation in products and processes. Membership in Shaker communities was not based on a common profession but on a group of individuals attracted to each other by similar interests and pursuits. Membership based on common interests rather than profession was also typical of the nineteenth century scientific communities examined by Burns and Stalker (1961). These relationships, based on common interests, facilitated the interchange of ideas equally with both men and women being a source of innovation. Because Shaker communities aspired to be self-sufficient, they attracted a variety of skills, thus increasing the communities' knowledge base.

Organizational knowledge bases may be classified in a variety of ways. Tacit knowledge refers to specific skills/information; whereas, implicit knowledge has more

to do with the know-how of the master craftsman (Nonaka, 1991). Both tacit and implicit knowledge may be either firm specific or pertaining to a broader group of organizations or fields of technology (Leonard-Barton, 1992). Nonaka (1991) believed that it was imperative to make tacit or personal knowledge available to others in order to spread new knowledge throughout the company; it also facilitates personal mastery (Senge, 1990). Quinn (1985) also observed that innovative companies exchanged knowledge with external stakeholders as well. The Shakers shared tacit skills internally with others who apprenticed with them as discussed later, and Shaker Elders and Eldresses were often shifted between communities to disseminate newly created knowledge (Melcher, 1968).

This wealth of knowledge permits organizations to have to resources, “to invent their way out of difficulties” (Leonard-Barton, 1992, p. 116) or simply innovate labor saving devices as in the Shaker example, see Tables I and II.

Management practices/systems

Employing management practices that enable organic structures to remain fluid and responsive to change and innovations is a core capability of innovative organizations (Leonard-Barton, 1992). Some of the management practices that encourage innovation as practiced by Shaker communities included: autonomy and cooperation in work practices, incentive systems, and development and training opportunities.

Autonomy is essential in organizations where knowledge is power. Autonomy is necessary so members can be empowered to use their knowledge in creative ways. This enables members to contribute meaningfully to the task at hand (Leonard-Barton, 1992). Providing autonomy in Shaker communities was facilitated because many of the members admitted were craftsmen already skilled in a particular line of work (Carson *et al.*, 2000). By the mid-nineteenth century, Shakers were given the freedom by the Elders to be creative in finding better ways to do jobs more quickly and to save time and labor. Many of the Shaker inventions were developed by one member to assist in solving the problems of another member. The reason why most Shaker inventions are not patented is the belief that others could build and improve on their innovations (Carson and Carson, 1998). To facilitate autonomy, Shakers were systematic in seeking a job-person fit, wherein, members were matched to jobs based on their abilities and skills, seeking Godly perfection in the process. As a result, the Shakers did not fear for their job security and could focus on the quality and the craftsmanship of their work (Carson *et al.*, 2000). The actual pace of the work was considered “temperate” by many observers, steady but never excessive (Andrews, 1953). The structure and focus just described, meant that workers need not have any fear or apprehension about their work or their security (Carson *et al.*, 2000). However, autonomy was tempered with cooperation in Shaker communities as discussed later on.

Incentive systems are critical components for encouraging innovative activities (Leonard-Barton, 1992; Quinn, 1985). In modern organizations incentives can include ownership, profit sharing, decision input, training opportunities, among others. For Shakers the needs of the individual were subordinate to those of the collective or community. All members shared in common property rather than individual gain. The greatest incentive was that Shaker innovations were directed largely at saving their own labor. For example, the invention of the circular saw reduced labor from that of 30 men to that of one man and a boy. The time saved permitted Shakers to pursue

religious and other intellectual pursuits (Andrews, 1953). This type of consecrated labor was found by Shakers to be a pleasure (Nordhoff, 1875).

According to Nonaka (1991) innovative Japanese manufacturers frequently used figurative language and symbolism to help flesh out the tacit knowledge of the individual employee who is highly committed to the organization, to come up with a new product or process innovation. While conscience and community norms were the primary incitements to labor (Andrews, 1953) and rewards were intrinsic (the satisfaction of a job well done for its own sake) (Sprigg and Larkin, 1987), Shakers used an abundance of slogans and exhortations (many of which were articulated by founder Ann Lee) that acted as guides or incentives to Shaker life and work (Carson *et al.*, 2000). Two key examples of these were “Hands to work, hearts to God” (Burns, 1987) which led to high quality craftsmanship, and “Waste not, want not” (Randolph and O’Keefe Bolick, 1990) which tended to drive the Shaker quest for innovations that would improve efficiency.

The emphasis was on the positive even when there were errors in the work. Nowhere in the Shaker philosophy/laws is there a reference to punitive actions. According to Mother Lee, action was more important for happiness (Carson *et al.*, 2000, p. 48). In addition, Randolph and O’Keefe-Bolick (1990) contend that the Shakers rotated jobs because they understood the importance of worker satisfaction. The Shaker system of job rotation is further discussed in the next section. As time went on the Shakers’ success became their own reward and success motivated the communities to continue to practice their inventiveness and craftsmanship as there was demand for the high quality products they produced.

Professional development/training is a key element in managing innovation in order to renew and broaden the knowledge base. The need for constant influx of new knowledge to foster innovation has long been recognized (e.g. Burns and Stalker, 1961). Personal mastery of ideas and skills is essential to innovation through learning (Senge, 1990). An emphasis on training is also consistent with contemporary practices of *Total Quality Management* (Deming, 1986) and lean production systems (Krafcik, 1988) as discussed subsequently. The two primary ways of achieving new learning are by having an influx of new members and by providing development opportunities for existing members. Shaker communities focused on both of these practices. Attracting new members was more challenging for Shakers in that they sought people with certain skills who also had a willingness to adopt their religious beliefs and in effect enter not just a work organization, but, a whole way of life. As the right candidates were often scarce, it was, therefore, particularly important for Shakers to develop the knowledge and skills of their own members. Modern innovative organizations recognize the importance of skill development; for example, Chaparral Steel has an apprenticeship program for their production staff involving both in class and on the job training (Leonard-Barton, 1992). The Shaker Covenant (1875) states that, “all should search to improve our time and talents in this life [..]”. Shakers began by placing people into jobs according to their skills, abilities, and preferences. As Carson *et al.* (2000, p. 462) note, “Believers were carefully trained for their jobs, not simply on their entry into the sect, but on an on-going basis”. The Shakers valued versatility, “If you improve in one talent, God will give you more” (Sprigg and Larkin, 1987, p. 112). Thus, Shaker training consisted of an apprentice-style training in one’s initial skill area coupled with job rotation. Since farming, textile work, and the like varied considerably,

from season to season, so did the tasks, which were required, to be performed, introducing considerable job variety. Additionally, jobs could be temporarily changed to support the good of the Family or the Community (Sprigg and Larkin, 1987). Thus, most workers became skilled in more than one area, and some Believers could produce quality work in up to a dozen occupations (Sprigg and Larkin, 1987). The previous conditions and beliefs led the Shakers to practice a policy of job rotation for many Shaker jobs (Andrews and Andrews, 1974; Sprigg and Larkin, 1987). Carson *et al.* (2000) noted that Shakers changed jobs every four to six weeks so as not to forget that their work was in the service of God. Cosgel and Miceli (1998) hypothesize that a job-rotating worker (rather than a specialized worker) is more likely to invent new products or machinery if the invention requires knowledge of multiple tasks or the entire production process. While evidence to support this hypothesis is anecdotal in nature and drawn from Shaker history (i.e. the invention of the circular saw and the flat broom), it does lend some credence to the argument that renowned Shaker inventiveness might be due at least in part to the practice of job rotation. Of course, many of the Shaker worker practices mentioned previously seemed to share extremely modern aspects (Mang, 1974).

Values and culture

“Truly innovative organizations create a climate conducive to innovation in all their parts [...]” (Damanapour, 1991, p. 584). Culture can be viewed at the societal and organizational levels. Recent research (Tellis *et al.*, 2009) suggests that of the two, corporate culture is the strongest driver of innovation. Thus, our focus on culture is more at the organizational/community level, as the Shaker movement examined here existed within a single national culture. Burns and Stalker (1961) observed that organic (adaptive) organizations replaced a hierarchic authority system with a set of shared beliefs about the values and goals of the institution. It is the core values that foster innovativeness in organizations (Barney, 1986). As used here, the culture of an institution represents the shared values and beliefs of members, which manifest themselves in the members’ actions and behavior (Hartmann, 2006). Having a valuable culture has been found to be associated with better economic performance (Barney, 1986).

The Shakers themselves represent a distinct culture with a unique social and economic system (Andrews and Andrews, 1974). Although much has been written on the Shakers’ religious beliefs and values (e.g. Andrews, 1953; Horgan, 1982), we focus on those values related to work and the Shaker economy. Believing the world was too materialistic; the Shakers set themselves up as separatists to work and worship in peace (Andrews and Andrews, 1974). Having done this, the need for self-sufficiency was critical. However, work was not just a practical necessity, it had a central religious purpose:

Work was currency of their (read Shaker) service. If the world was to be redeemed and restored to God, the Shakers would accomplish it by the dedicated labor of their hands. They believed that God dwelt in the details of their work and in the quality of their craftsmanship (Burns and Burns, 1988, p. 30).

Hard labor was a sacred privilege, a test of faith (Andrews and Andrews, 1974). The Shakers’ dedication to hard work and perfectionism yielded a very high quality in their craftsmanship. We examine four broad values/beliefs found to be central to

innovativeness and also found to be central to the Shaker belief system: dedication to quality, long-term outlook, cooperation, and tolerance for risk.

The Shaker's dedication to quality has been clearly articulated by Carson *et al.* (2000, p. 45), "Their [Shakers'] aims were not profits, but flawless quality, the path to redemption." As these authors also note, the Shaker's emphasis on quality was to both honor and imitate God's own creation in order to get closer to their deity. The innovation process starts with the need to solve a problem (Rogers, 1995); this process often arises, from a dissatisfaction with the status quo (Birkinshaw and Mol, 2006), and or the desire for continuous improvement. Constantly seeking perfection or improvement leads to innovative behaviors (e.g. Leonard-Barton, 1992). In this vein a quality driven organization becomes an innovative one.

As Carson *et al.* (2000) note, total quality management (TQM) helps to illustrate the Shaker's dedication to quality. Briefly, TQM is a management philosophy and set of practices that focuses on the continuous improvement of all elements in the production process, with the goal of producing the highest quality (zero defects) product(s) resulting in customer satisfaction (Krajewski and Ritzman, 1996). Concepts of lean production systems discussed by others (Krafcik, 1988) also share's TQM's concern for detecting and correcting quality problems. Because of its focus on quality, we will emphasize some of the principles of TQM in this analysis. Using the 14 principles of an early pioneer of TQM, W.E. Deming (1986), Carson *et al.* (2000) found some striking similarities between his principles and Shaker philosophy and work practices. Their conclusion was that the religious values of the Shaker industrial system bear a striking resemblance to Dr Deming's TQM philosophy despite the differences in historical eras.

In our examination of the management of innovation and Shaker society, we also find numerous commonalities between Shaker beliefs and practices and some of Deming's (1986) TQM principles. For example, Deming wished to eliminate the need for product inspections by building quality into the product initially. For the Shakers, all work was done as "consecrated labor" (i.e. labor in the service of God) and was performed with extra care and attentiveness (Carson *et al.* 2000, p. 40). Furthermore, Shakers believed that God dwelt in the details of their craftsmanship (Burns and Burns, 1988, p. 30). Continuous improvement and cost reduction are recurring Deming themes. Tables I and II list numerous inventions and product improvements where the Shaker concept of "consecrated ingenuity" (Williams, 1957) led to innovation that benefited the Shakers and the outside world. Other Deming (1986) principles such as institute training on the job and a vigorous program of education and self-improvement were an important part of the Shaker work process as discussed previously. The Shakers were also in conformance to Deming's (1986) principle barrier-free departments that work as a team, discussed subsequently. Above all, Shakers were able to have pride in their workmanship as they sought Godly perfection in the details of their work; this principle was considered very important in Deming's (1986) approach to achieving quality and is critical to innovation.

Having a long-term outlook or future orientation has been found to be a key belief in innovative organizations. Some current organizations have time horizons that range from three to 25 years for developing new ideas/products (Quinn, 1985). This value enables organizations to be strategic about the actions they take (Leonard-Barton, 1992). A future orientation permits experimentation including learning from failures, which is key to trying new things rather than simply focusing on the short run

(Hartmann, 2006; Thom, 1990). Without this belief, innovation is not likely to occur. This view is also supported by Deming's (1986, p. 25) TQM principle of constancy of purpose which meant that a quality output required, as the Shakers believed, "[...] hard thinking about the future" and a "[...] faith that there would be a future". The Shakers demonstrated this optimism by spending obvious care and time making humble, useful things (Jones, 1995). Taking a long-term view enabled the Shakers to easily adopt or incorporate other values related to innovativeness such as learning and risk tolerance.

The genesis of much of the scientific ideas of the nineteenth century grew out of groups of specialists in universities and other institutions segregated from the rest of society (Burns and Stalker, 1961). This separation enabled these individuals to focus on learning and developing their ideas without the pressure of having to always produce something marketable in the short run. This sort of intellectual segregation also existed in Shaker colonies. As discussed, Shakers valued learning; therefore, they frequently learned more than one skill. In order to diffuse knowledge learned in one community, Elders and Eldresses often transferred between Shaker communities to spread their ideas (Melcher, 1968). The Shakers could take their time in developing new ideas because their goal was perfection, not fulfilling a particular demand in the marketplace.

Cooperation through a network of individuals is key to sharing of information and learning. Over time trust forms among members that further diffuses the ideas for innovative products and practices (Tidd, 2001). Cooperation is a hallmark of learning organizations because it fosters team learning (Senge, 1990). Teamwork is also a characteristic of lean production systems (Krafcik, 1988) and results in a workforce that is greater than the sum of its parts. Moreover, a key TQM principle was having barrier free departments that work as a team (Deming, 1986). Valuing cooperation breaks down hierarchical relationships, which stifle the flow of new ideas (Burns and Stalker, 1961; Leonard-Barton, 1992). As a result organizations that value cooperation among its members tend to be more innovative. The Shaker work environment was marked by co-operation and a sense of purpose. Shakers were united in separate religious communities in order to build a millennial society superior to the outside world. They shared all property in common, according to one of the practices of the primitive church in Jerusalem (Andrews and Andrews, 1974). As part of the cooperative, individuals were not paid wages, and all profits were re-invested in the community or went to charity. Thus, any individual inclination to act competitively in the pursuit of material gain was thwarted and in any case unnecessary as the community provided for everyone's needs. One of the attractions of Shaker life was their belief in teamwork, "[...] Teamwork requires one to compensate with his strength someone else's weaknesses for everyone to sharpen each other's units with quantities" (Deming, 1986, p. 64). In this strongly supportive work environment Shakers felt free to experiment and innovate and frequently put their heads together to discuss problems and opportunities and to share knowledge and ideas (Betts, 1989). Consequently, Shakers were often able to devise innovative solutions. The importance of cooperation also reflects the recognition that, when one is developing something new, two heads are usually better than one.

Having a tolerance for risk has been found to be critical to innovative success (Hartmann, 2006; Tellis *et al.*, 2009; Terziovski, 2010). Developing new ideas is not an

exact science and requires a certain amount of trial and error. Firms in industries such as pharmaceuticals and technology have long realized that only a small percentage of their research and development efforts ever appear on the market (Birkinshaw and Mol, 2006). Were these firms not tolerant of risk, they would not engage in such experimentation. This value coupled with a future orientation is critical to promoting innovative activity on a regular basis (Thom, 1990). Sharing common beliefs, possessing a longer-term orientation, and having an emphasis on cooperation rather than punishment made it easier for the Shakers to experiment and tolerate risk. In this type of environment Shakers felt free to experiment and innovate and, consequently, they often devised new solutions (Betts, 1989). Many were attracted to Shakerism because it promised a safe existence rather than a spiritual transformation. As one believer wrote in a letter, "I am perfectly content. I have enough to eat and drink [...] and just as much work as I like [...]" (Newman, 1989, p. 313). Experimentation, and the concomitant tolerance for risk, were also brought about by the Shakers' quest for perfection. Since all work was performed in the service of God (Carson *et al.*, 2000) and, "[...] work well done was considered a form of worship" (Hudson, 1992, p. 28), Shakers were also encouraged to use everything and find ways to avoid waste (Randolph and O'Keefe-Bolick, 1990). The Shakers took great care to perfect their work in order to both honor and imitate the creation of God (Carson *et al.*, 2000). Thus, having a tolerance for risk in the context of a secure environment and in pursuit of perfection to glorify God was an easy value to hold and express in the Shakers' daily life and work.

While the Shaker tradition held many more values and beliefs than discussed here, it is these intangible aspects of Shaker culture that may contribute the most to explaining their innovativeness as a community.

Summary and implications

The record is quite clear that the Shaker Society produced numerous practical innovations to aid their communities in completing their daily tasks more efficiently and effectively. What is not so clear, are the reasons for this innovativeness. To be sure their equating work with the work of the divine and their quest for perfection to honor God appear to be driving forces. This study also argues that an examination of the literature on the general management of innovation that has developed after the Shaker Society may also help inform/explain the Shaker innovativeness. Shaker Society possessed some organizational characteristics, management practices, and values that have subsequently been found to be related to innovative behaviors in modern institutions.

On a per capita basis, Shakers were more inventive than society at large. Much of their inventions reflected the agrarian and land-based nature of their economy. The innovativeness of Shaker Society stems, in part, from the tenets of their faith and its practice. They were separatists from society and as a result needed to be self-sufficient in providing for their own needs. Work was a form of worship, and Shakers devoted a lot of attention to it including ways of performing the work better and more efficiently to leave time for worship or other intellectual pursuits. As a collective society, all proceeds were reinvested in the community; there was no room or desire for individual gains. These "religious" elements can help explain some motivations for their inventiveness. However, by examining the innovativeness of Shaker society through the lens of modern concepts of innovation management, we can gain an insight into their inventiveness that may be more meaningful to the current times. At the same time

Shaker innovation processes can help inform and illuminate some of the concepts of modern innovation management.

This study used three dimensions of the general management of innovation to examine Shaker innovation processes: organization structure, management practice, and culture. A total of ten modern innovation management concepts were analyzed in the context of Shaker innovativeness. This analysis provides implications for managerial action points to foster innovation in today's organizations and are depicted in Table III.

In structuring for innovation, managers should pay careful attention to the recruitment of members who share core knowledge needed by the organization. For Shakers, this knowledge was the belief in God and the value of work, craftsmanship, and community. In contemporary organizations, it would have to be knowledge based on a shared vision of the organization (Nonaka, 1991; Quinn, 1985) and a skill set relevant to its purpose. It was noted that Shakers practiced job-person fit in the initial assignment. Today's organizations are also wise to return to that approach in selecting their members (e.g. Kristof-Brown *et al.*, 2005). Another structural characteristic of Shaker communities was their small size of less than 400 members. This helped foster communication and reduce the need for excessive bureaucracy, thereby, encouraging innovation. Today's larger organizations should consider both the size of their project teams as well as their divisions to insure that they can maintain the flexibility and more easily interchange ideas crucial to innovation (Burns and Stalker, 1961; Quinn, 1985).

Knowledge as opposed to hierarchical rank should be the basis for influence in innovative organizations. For the Shakers the knowledge consisted of both religious beliefs and earthly skills, which were deemed to be held equally by both males and females. In today's organizations the skills/knowledge should be related to its mission as well as having members open to new ideas (e.g. Rogers, 1995). According to current theories of learning organizations (e.g. Nonaka, 1991), everyone should be viewed as a knowledge worker capable of developing new ideas.

A Shaker management practice relevant to innovating in today's organizations is the empowerment of employees through autonomy. Shakers empowered their members to use labor saving methods because many of them were craftsmen in their own right. Knowledge creation is everyone's job in the today's learning organization (Nonaka, 1991). Empowered employees are more willing to try out new ways of doing things (Leonard-Barton, 1992). The Shakers also encouraged and motivated labor saving methods to devote more time to worship. Chief among their incentives was the use of slogans such as, "Hands to work, hearts to God" (Burns, 1987) leading to higher quality work as well as the notion that success was its own reward. While incentives have to be modified for a secular and a materially-oriented society today, the emphasis should be on the positive such as creating motivating work environments and opportunities for learning via job rotation and training. The Shakers remind us that to create knowledge, continuous learning is important for members/employees. The Shakers placed heavy emphasis on job training of all types. They even transferred members between communities at times for that purpose. The emphasis on training is as important today because, through training, knowledge can be created and broadened. Managerial actions pertaining to training are consistent with a number of modern management concepts including: as an aid to develop learning organizations (e.g. Senge, 1990); being relevant to principles of TQM concerning educational

Innovation management concepts	Effect on innovation	Reflected in Shaker practice
<i>Organization structure:</i> Membership criteria	Based on shared knowledge that facilitates communication Flexibility and responsive to change	Similar belief in God, celibacy, value of work, and community Self-sufficient, small shaker communities of less than 400
Smaller units		Shakers knowledge included common religious beliefs, and they possessed a variety of earthly skills used in inventions
Knowledge versus hierarchy	Knowledge not rank is the resource and a power base for change	
<i>Management practices:</i> Autonomy	Empower people to use knowledge creatively	Elders gave members freedom to find labor saving methods
Incentive systems	Encourage/motivate innovative practices	Labor saving methods and devices enabled shakers to devote more time to worship. Success was its own reward
Development and training	To renew and broaden the knowledge base	Person-job match, on job training, job rotation according to the seasons
<i>Values and culture:</i> Dedication to quality	Emphasizes constant improvements to existing as well as new ideas Permits experimentation with new ideas Facilitates knowledge sharing and learning	Quality seeks to draw closer to God View associated with a faith in the future Shaker culture focused on community of mutual support; teamwork compensated for individual weaknesses
Long-term outlook Cooperation		Constantly improved work in a quest for perfection to honor God
Risk tolerance	Stimulates experimentation through trial and error	

Table III.
General Management of
Innovation Concepts as
Manifested in Shaker
Communities

programs and self-improvement (Deming, 1986); and the emphasis of lean production systems regarding training for a variety of skills or jobs (Krafcik, 1988).

Perhaps more than anything, the Shaker's religious orientation helps provide today's managers with guidance regarding ways to create a culture of innovation by having an appropriate set of values, such as, having a dedication to quality, a long term perspective, the importance of valuing cooperation, and having a tolerance for risk. A dedication to quality often leads to innovation because it is based on the principle of constant improvement. For the Shakers, quality was a search for perfection in their work and that search drew them closer to God. Contemporary management practices such as TQM is based on a similar process of continuous improvement (Deming, 1986). It has also been noted that currently innovations in organizations are incremental because solutions to problems are multi-faceted (Quinn, 1985). Thus, having a culture valuing quality is important for fostering innovation.

Possessing a long versus short-term outlook is critical to managing an innovative organization. This perspective came naturally to Shakers who possessed a faith in the future. Likewise, innovation today must avoid short-term thinking that leads to quick fixes and eschews quality innovations (Quinn, 1985). Managers must possess a long-term orientation and have a willingness to learn from failure if they hope to foster innovations in their units (Hartmann, 2006; Thom, 1990). Managers should foster cooperation among team members because it fosters knowledge sharing and learning, both key to innovation. The Shakers were a community of mutual support because being part of a group compensated for individual weaknesses. Current management theories such as TQM also recognize the value in having departments that work as a team to improve quality (Deming, 1986) and build trust (Tidd, 2001) to facilitate innovation.

Managers fostering an innovative organizational culture should tolerate the risk of failure. This value stimulates experimentation, which is at the core of most innovative processes (e.g. Rogers, 1995). Shakers would seek to constantly improve their work and, thereby, honor their God. One way today's managers can manage the risk of innovations is by having two teams work independently on the same project to increase the chance of a solution (Quinn, 1985).

While it is true that modern innovation management concepts can help us understand what enabled the Shakers to be so innovative. It is also true that the Shaker example can help illustrate the value of concepts to understand today's innovation processes. The Shaker story provides a very rich longitudinal case study with which to examine these concepts individually and how they work in concert with each other to foster innovation.

In conclusion it is likely that a more in depth look at the values, structure, and practices of Shaker Communities would yield additional information on the general management of innovation that could well inform the innovation process in contemporary organizations. Moreover, more richly detailed lessons or techniques for managing innovations in current organizations may be obtained by studying Shaker inventiveness using concepts from other fields such as marketing (product management), Operations, and R&D/technology management. Thus, while modern theories and perspectives may help us understand historical phenomena in our present context, a closer examination of historical phenomena may also help inform our understanding of similar phenomena in modern institutions, in this case the general management of innovation. We encourage others to examine the Shaker movement with this goal in mind.

References

- Andrews, E.D. (1953), *The People Called Shakers: A Search for the Perfect Society*, Oxford University Press, New York, NY.
- Andrews, E.D. and Andrews, F. (1974), *Work and Worship: The Economic Order of the Shakers*, New York Graphic Society, Greenwich, CT.
- Andrews, K.R. (1987), *The Concept of Corporate Strategy*, 3rd ed., Dow Jones, New York, NY.
- Barney, J.B. (1986), "Organizational culture: can it be a source of sustained competitive advantage?", *Academy of Management Review*, Vol. 11 No. 3, pp. 656-65.
- Betts, J.E. (1989), "The Shaker as new product developers", *Shaker Spirit*, Vol. 1 No. 1, May, pp. 10-12.
- Birkinshaw, J. and Mol, M. (2006), "How management innovation happens", *MIT Sloan Management Review*, Vol. 47 No. 4, pp. 81-8.
- Burgelman, R.A. (1984), "Designs for corporate entrepreneurship in established firms", *California Management Review*, Vol. 26 No. 3, pp. 154-66.
- Burns, A.S. (1987), *The Shakers: Hands to Work, Hearts to God*, Aperture Foundation, New York, NY.
- Burns, A.S. and Burns, K. (1988), "The Shakers", *American History Illustrated*, Vol. 23 No. 4, pp. 24-33.
- Burns, T. and Stalker, G.M. (1961), *The Management of Innovation*, Tavistock Publications, London.
- Carson, P.P. and Carson, K.D. (1998), "Theoretically grounding management history as a relevant and valuable form of knowledge", *Journal of Management History*, Vol. 4 No. 1, pp. 29-42.
- Carson, P.P., Lanier, P. and Carson, D.C. (2000), "An historical examination of early 'Believers' in the quality management movement: the Shaker example", *The TQM Magazine*, Vol. 12 No. 1, pp. 37-52.
- Clark, P. and Rowlinson, M. (2004), "The treatment of history in organization studies: towards an 'historic turn'?", *Business History*, Vol. 46 No. 3, pp. 331-52.
- Cosgel, M.M. and Miceli, T.J. (1998), *On Job Rotation*, University of Connecticut, Storrs, CT, working paper 1998-02R, Department Economics working paper series.
- Crawford, C.M. (1987), *New Products Management*, 2nd ed., Irwin, Homewood, IL.
- Damanpour, F. (1991), "Organizational innovation: a meta-analysis of effects of determinants and moderators", *Academy of Management Journal*, Vol. 34 No. 3, pp. 555-90.
- Deming, W.E. (1986), *Out of Crisis*, Center for Advanced Engineering Study, MIT, Cambridge, MA.
- Dixon, W.H. (1867), *New America*, 3rd ed., J.B. Lippincott and Co., Philadelphia, PA.
- Drejer, A. (2002), "Towards a model for contingency of management of technology", *Technovation*, Vol. 22 No. 6, pp. 363-70.
- Duffield, H.G. (2000), *Historical Dictionary of the Shakers*, The Scarecrow Press, Lanham, MD, and London.
- Emerich, A.D. and Benning, A.H. (1983), *Community Industries of the SHAKERS: A New Look*, Shaker Heritage Society, Watervliet, NY.
- Encyclopaedia Britannica (2007), "Shaker", *Encyclopaedia Britannica Online*, 30 January, available at: <http://search.eb.com/article-9067086>
- Ettlie, J.E. (2000), *Managing Technological Innovation*, John Wiley & Sons, New York, NY.
- Harrington, S. (2005), "Fruits of the tree: resources on Shaker art", *Reference Services Review*, Vol. 33 No. 2, pp. 235-49.

- Hartmann, A. (2006), "The context of innovation management in construction firms", *Construction Management and Economics*, Vol. 24, pp. 567-78.
- Horgan, E.R. (1982), *The Shaker Holy Land: A Community Portrait*, The Harvard Common Press, Cambridge, MA.
- Hudson, P.L. (1992), "With hands and hearts", *Americana*, Vol. 20 No. 3, pp. 24-31.
- Jankowski, J.E. (1998), "R&D: foundation for innovation", *Research-Technology Management*, Vol. 41 No. 2, pp. 14-20.
- Jones, A. (1995), *Shaker Furniture*, St Remy, New York, NY.
- Joy, A.F. (1960), *The Queen of the Shakers*, T.S. Denison, Minneapolis, MN.
- Kimberly, J.R. and Evanisko, M.J. (1981), "Organizational innovation: the influence of individual, organizational and contextual factors on hospital adoption of technological and administrative innovations", *Academy of Management Journal*, Vol. 24 No. 4, pp. 689-713.
- Kotter, J.P. (1982), *The General Managers*, Free Press, New York, NY.
- Krafcik, J.F. (1988), "Triumph of the lean production system", *Sloan Management Review*, Vol. 30 No. 1, pp. 41-51.
- Krajewski, L.J. and Ritzman, L.P. (1996), *Operations Management Strategy and Analysis*, 4th ed., Addison Wesley Longman Publishing Company, Reading, MA.
- Kristof-Brown, A.L., Zimmerman, R.D. and Johnson, E.C. (2005), "Consequences of individuals' fit at work: a meta-analysis of person-job, person-organization, person-group, and person-supervisor fit", *Personnel Psychology*, Vol. 58 No. 2, pp. 281-342.
- Leonard-Barton, D. (1992), "Core capabilities and core rigidities: a paradox in management new product development", *Strategic Management Journal*, Vol. 13, pp. 111-25.
- McGrath, P. (2007), "Knowledge management in monastic communities of the medieval Irish Celtic church", *Journal of Management History*, Vol. 13 No. 2, pp. 211-23.
- Mang, K. (1974), *The Shakers: Another America*, Staatliches Museum, Knust.
- Melcher, M.F. (1968), *The Shaker Adventure*, Case-Western University, Cleveland, OH.
- Melton, J.G. (1992), *Religious Bodies in the United States*, Garland Publishing, New York, NY.
- Meyer, A.D. and Goes, J.B. (1988), "Organizational assimilation of innovations: a multilevel contextual analysis", *Academy of Management Journal*, Vol. 31 No. 4, pp. 897-923.
- Neal, J. (1974), *The Shaker Image*, *Shaker Community*, New York Graphic Society, New York, NY.
- Newman, C. (1989), "The Shaker's brief eternity", *National Geographic*, Vol. 176 No. 3, pp. 302-25.
- Nonaka, I. (1991), "The knowledge-creating company", *Harvard Business Review*, Vol. 69 No. 6, pp. 96-104.
- Nordhoff, C. (1875), *The Communistic Societies in the United States*, Dover Publications, New York, NY.
- Pheng, L.S. (2007), "Managing building projects in ancient China: a comparison with modern-day project management principles and practices", *Journal of Management History*, Vol. 13 No. 2, pp. 192-210.
- Quinn, J.B. (1985), "Managing innovation: controlled chaos", *Harvard Business Review*, Vol. 63 No. 3, pp. 73-84.
- Randolph, S.G. and O'Keefe-Bolick, N. (1990), *Shaker Inventions*, Walker and Company, New York, NY.
- Richmond, M.L. (1977), *Shaker Literature, Volume 1. By The Shakers*, Shaker Community, Hancock, MA.

-
- Rogers, E.M. (1995), *Diffusion of Innovations*, 4th ed., Free Press, New York, NY.
- Senge, P. (1990), *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, New York, NY.
- Shakers: The United Society of Believers (2001), *Religious Movements Homepage*, available at: <http://religiousmovements.lib.virginia.edu/nrms/Shakers.html> (accessed December 30, 2003).
- Shipper, F. and Manz, C.C. (1998), "W.L. Gore & Associates, Inc. in 1998", in Thompson, A.A. and Strickland, A.J. (Eds), *Strategic Management: Concepts and Cases*, 11th ed., McGraw Hill, New York, NY.
- Skocpol, T. (1984), "Emerging agendas and recurrent strategies", in Skocpol, T. (Ed.), *Vision and Method in Historical Sociology*, Cambridge University Press, Cambridge, pp. 365-91.
- Sprigg, J. and Larkin, D. (1987), *Shaker Life, Work, and Art*, Stewart, Tabori, and Chang, New York, NY.
- Stein, S.J. (1992), *The Shaker Experience in America: A History of the United Society of Believers*, Yale University Press, New Haven, CT, and London.
- Swank, S.T. (2003), *Canterbury Shaker Village*, The Creative Company, Lawrenceburg, IN.
- Tellis, G.J., Prabhu, J.C. and Chandy, R.K. (2009), "Radical innovation across nations: the pre-eminence of corporate culture", *Journal of Marketing*, Vol. 73, pp. 3-23.
- Terziovski, M. (2010), "Innovation practice and its performance implications in small and medium enterprises (SMEs) in the manufacturing sector: a resource-based view", *Strategic Management Journal*, Vol. 31 No. 8, pp. 892-902.
- Thom, N. (1990), "Innovation management in small and medium-sized firms", *Management International Review*, Vol. 30 No. 2, pp. 181-92.
- Tidd, J. (2001), "Innovation managements in context: environment, organization and performance", *International Journal of Management Reviews*, Vol. 3 No. 3, pp. 169-83.
- White, A. and Taylor, L.S. (1904), *Shakerism: Its Meaning and Message, Columbus*, AMS Press, New York, NY, reprinted in 1971 by AMS Press.
- Wikipedia (2006), *Shakers*, available at: <http://en.wikipedia.org/wiki/Shakers> (accessed December 26).
- Wikipedia (2007), *Patent*, available at: <http://en.wikipedia.org/wiki/Patent> (accessed January 17).
- Williams, J.S. (1957), *Consecrated Ingenuity. The Shakers and Their Inventions*, Shaker Museum Foundation, Old Chatham, NY.

About the authors

John F. Preble, PhD (University of Massachusetts), is an Associate Professor of Strategic Management at the Lerner College of Business and Economics, University of Delaware. His research interests and numerous publications are in management and marketing strategy and global business.

Richard C. Hoffman, PhD (Indiana University), is Professor of Management at the Perdue School of Business, Salisbury University, and served as Interim Dean, 2007-2010. His research interests and publications include business strategy, innovation decision-making, and comparative management topics. Richard C. Hoffman is the corresponding author and can be contacted at: rchoffman@salisbury.edu