

TRANSFORMATIONAL LEADERSHIP, INNOVATION AND
KNOWLEDGE MANAGEMENT: EMPIRICAL FINDINGS
AND EMERGENT CONCLUSIONS

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This study (N = 1046) investigated the relationship between innovation, transformational, transactional, and laissez-faire leadership and knowledge management. The combined model of innovation and transformational leadership significantly predicted knowledge management, accounting for 29.4% of the variance. Knowledge management was negatively predicted by laissez-faire leadership. Knowledge management behaviors were not related to transactional leadership overall, but were significantly predicted by each subscale. These findings warrant further investigation.

INTRODUCTION

Nearly every modern organization is confronting the change in information systems, from ledger cards to digital processing. Today, information flows in directions and with speed that only a few years ago we could not imagine. The change has been nothing short of a revolution. Our current trend toward informatics effects the process of leadership by speeding up the inputs, requiring faster and more personal transformation of the product, all in a business climate that builds competition through “response time” to customer demands. The function of leadership in the short-term future will be impacted by the current information revolution.

AN EMERGING KNOWLEDGE ORGANIZATION

Over the past 15 years the term “knowledge management” has evolved to represent the

changing nature of the workplace – a true paradigm shift. In coining the phrase “knowledge society” Peter Drucker convincingly argued that land, labor, and capital – the classical factors of production – had been largely replaced by knowledge (Drucker, 1993), “that knowledge has become *the* resource, rather than *a* resource, is what makes our society ‘post-capitalist’”(p. 45). Lang (2001) clarified the importance of the knowledge worker, “while the knowledge worker may need the tools of production the organization owns, while she may well have to work in organizations, she nevertheless owns the means of production” (p. 44). Hitt (1995) further argued, “It seems evident that the learning organization is a paradigm shift from the more traditional organization. Indeed, it is a paradigm shift of the highest order. We are witnessing the emergence of a radically new perspective of organization: how they should function, how they should be managed, and how they should cope with change” (Hitt, 1995, p. 17). Rowley (1999) suggested that “the knowledge based society has arrived, and those organizations that can succeed in the global information society are those that can identify, value, create, and evolve their knowledge assets” (p. 416). Rowley continued by noting that effective management of knowledge, change, and innovation are central or “core competencies” that must be mastered for organizations to succeed.

BASICS OF KNOWLEDGE MANAGEMENT

As a preliminary consideration, it seems important to define the seemingly self-evident term – knowledge. While *prima facie* it seems obvious, the reality is that knowledge is quite complex (Clark & Rollo, 2001). Of central importance is the type of knowledge that organizations are forced to manage. If all knowledge were codified and formal, or explicit, then the function of knowledge management would be little more than compliance and management. The reality is that much of the information that organizations try to manage is held within the

personal and collective experiences of the workforce; it is tacit knowledge. Bollinger and Smith (2001) explained, “Tacit knowledge is unarticulated knowledge that is in a person’s head that is often difficult to describe and transfer. It includes lessons learned, know-how, judgment, rules of thumb, and intuition...it is key characteristic of team-based learning organizations” (p. 9). Tacit knowledge is an important resource of organizations given that 42% of corporate knowledge is held within employee’s minds (Clarke & Rollo, 2001).

Knowledge management is jointly a goal and a process. As an outcome or goal, knowledge management is entirely focused on sharing information for the benefit of the organization, as Bollinger and Smith (2001) concluded. They reasoned, “the knowledge management process is not so much about control as it is about sharing, collaboration, and making the best possible use of a strategic resource” (p. 14). Knowledge management is primarily about making tacit knowledge more accessible since it accounts for a majority of an organization’s collective knowledge (Clarke & Rollo, 2001). Lang (2001) explicated the goal of knowledge management, “Knowledge management systems must connect people to enable them to think together and to take time to articulate and share information and insights they know are useful to their company” (p. 44). Stonehouse and Pemberton (1999) also suggested, “it is the role of knowledge management to ensure that individual learning becomes organizational learning” (p. 132). Birkinshaw (2001) referred to this process as ‘recycling’ old knowledge. The process of knowledge management is based on the ability of all members of the organization to add value to the basic business processes through the creation, communication, codification, and coordination of both explicit and tacit knowledge stores (Nonaka & Takeuchi, 1995). Knowledge management is a complex process without end, but effective knowledge management can be a goal for any organization.

Barth (2003) and Seng, Zannes, and Pace (2002) detailed several distinctive personal knowledge management process tools. Barth's framework provided perhaps the most effective and developed comprehensive categorization of personal knowledge management processes. It included:

1. Accessing. Search strategies, research, inquiry.
2. Evaluating. Judgment, confirmation of information, qualification.
3. Organizing. Filtering, discarding, filing and archiving.
4. Analyzing. Critical thinking, sense-making, testing hypotheses.
5. Conveying. Explaining, presenting, written and spoken conveyance.
6. Collaborating. Messaging, sharing documents, meetings and conversations.
7. Securing. Self-discipline, backup, inoculation, threat awareness.

Of the conclusions that could be drawn regarding the specific processes of knowledge management, two quickly come to mind. First, each of the knowledge management processes have been traditionally the domain of leaders and managers. Second, these processes, as in the past, require much more than just a technological solution.

TRANSFORMATIONAL LEADERSHIP AND INNOVATION

Burns (1978) defined transformational leadership as a process in which "leaders and followers raise one another to higher levels of morality and motivation" (p. 20). A chief element of transformation is the ability to cultivate the needs of the follower in a follower-centered manner. According to Burns, focusing on needs makes leaders accountable to the follower. First, Burns contended that followers are driven by a moral need, the need to champion a cause, or the need to take a higher moral stance on an issue. People like to feel that a higher organizational spiritual mission guides their motives (Tichy & Devanna, 1986). The second

need is a paradoxical drive for consistency and conflict. Transforming leaders must help followers make sense out of inconsistency. Conflict is necessary to create alternatives and to make change possible. The process of transformation is founded on empathy, understanding, insight, and consideration; not manipulation, power wielding, or coercion.

Few researchers address the link between information technology and leadership, and even fewer address the relationship between transformational leadership and knowledge management. According to Klenke (1994), information technology and the actions of leaders create new organizational forms. The relationship between innovation and leadership is difficult to articulate given the variety of functional leadership behaviors and the range of information technologies. Technology and leadership have reciprocal effects on each other; a change in one necessitates a change in the other. Brown (1994) speculated that transformational leadership is needed in an evolving technological society. Societally, we are moving from controlled change to accelerated change nearly beyond control. Transformational leaders must meet market demands faster and better than before, given the increasingly interdependent economy.

Limited research addressed the relationship between innovation and transformational leadership. Howell and Higgins (1990a, 1990b, 1990c) contended that champions of innovation were significantly more transformational than non-champions. Champions are generally considered to be key organizational decision-makers that advocate enhanced use of technological solutions, but often are not as technologically literate as specialists in the organization.

Champions operate in three ways:

- Implement rational methods that promote sound decision making based on organizational rules and procedures,
- Engage in a participative process, enlisting others' help to gain approval and

implementation of the innovation,

- Work outside the formal channels of bureaucratic rules and engage in the renegade process (Howell & Higgins, 1990a, 1990b, 1990c).

In a series of articles, Crawford (1998), Crawford and Strohkirch (1997a, 1997b, 2000), and Crawford, Gould, and Scott (2003) established the argument that transformational leadership was related to personal innovation. In their findings, transformational leaders were significantly more innovative than transactional and laissez-faire leaders. Innovation is often assumed to be one of the important characteristics of knowledge managers. One behavioral manifestation of innovation is the ability to create and manage information and knowledge. Given the substantial relationship between innovation and transformational leadership, research looking at the relationship of one outcome of innovation (knowledge management) and transformational leadership seems deserving of further investigation (Bryant, 2003; Crawford & Strohkirch, 2002).

INNOVATIVE LEADERSHIP IN KNOWLEDGE ORGANIZATIONS

Mahoney (2000) crystallized the position well, “Let me say from the start that in my view leadership must exist at all levels in an organization, regardless of the size, for it to consider itself a learning organization...there is no excuse for them [leaders] not creating an environment where everyone can participate in this process” (p. 241). Bailey and Clarke (2000) highlighted the disconnect in how leadership has not kept pace with the need to understand the role of knowledge, “for some reason many managers have yet to grasp the clear personal relevance, utility, and organizational significance of knowledge management” (p. 235). They further reported that many leaders felt that knowledge management was more fad than reality, or

struggled to both conceptualize and practice knowledge management. Scharmer (2001) charged leaders with a nearly impossible task, “Leaders...face a new challenge. Leaders must be able to see the emerging opportunities before they become manifest in the marketplace” (p. 137).

Leaders play a crucial role in building and maintaining an organizational culture of learning.

They specifically infer that leaders must attach a high value to knowledge, encourage questioning and experimentation through empowerment, build trust, and facilitate experiential learning of tacit knowledge (Stonehouse & Pemberton, 1999).

Some limited empirical findings on the role of leadership in the knowledge organization have been published, but this type of investigation has not been the norm. In a limited interview of leaders, Johnson (2002) found a common theme, “A critical point, though, is that they paid attention themselves [sic] to the learning organization initiative....The idea that everyone in the organization pay attention to learning ran through the data” (p. 246). Johnson (2002) made several conclusions based on the data, but of most significance is the idea that knowledge management applies to the entire organization, from top to bottom. Finally, in another substantial empirical piece, Politis (2001) looked at the relationship between self-management, transformational/transactional leadership, and various knowledge management attributes. Politis found that self-management, transformational, and transactional leadership styles are related to dimensions of knowledge acquisition. The empirical findings, though limited, seem to lend some support to the theoretical assumptions made by many authors speaking of the need for participative collaborative leadership in the face of the transition to the knowledge society. The construct of leadership is either not distinguished from organizational position or may be directly confounded by it.

Finally, Bryant (2003) argued that there is a clear relationship between transformational

leadership and knowledge management in organizations. While Bryant's piece is pre-empirical, this foundation serves as ample motivation for further investigation of the relationship between the two concepts. Bryant (2003) made the point very clearly,

The greatest need in this area is empirical testing of the organizational knowledge constructs. Researchers may want to explore...the link between transformational leadership and managing knowledge at the individual and group levels and the link between transactional leadership and managing knowledge at the organizational level (p. 41).

Bryant's research provides some basis from which to speculate that transformational leadership might be a causative factor influencing greater knowledge management skills, though his research focus does not empirically test the causative direction between the two variables.

METHODS

Subjects

Subjects (N = 1046) were selected from a sample of students taking classes in a non-traditional graduate degree program and other associated individuals. Over 50% of the subject population was over 30 years of age. More females (n = 581) completed the assessment than males (n = 487). Well over 50% had been employed for over 5 years, and well over 50% were in positions of management (ranging from supervisory to executive level). Finally, over 90% of the sample indicated that they used computer technology more than irregularly, and by far, most used computer technology on a daily basis.

Procedure

The entire instrument battery was administered to subjects following a brief set of instructions. Subjects were asked to grant legal consent and to indicate if they wished for more

information following the accumulation of results. Subjects were given ample time to complete the instrument (generally 20 minutes was sufficient). Participants were asked to return the instrument to an instructed location when they completed it. Following administration of the instrument battery data analysis occurred.

Instrumentation

The first instrument utilized in this instrument battery was the Knowledge Management Inventory (KMI). This inventory focused exclusively on the behavioral aspects of knowledge management and the content of the questions was derived from the Barth (2003) typology of personal knowledge management categories. Barth had seven categories of personal knowledge management and four questions from each of the categories were selected for the KMI. Once created, the KMI was administered to a pilot sample (N = 99) for the purposes of establishing reliability estimates ($\alpha = .86$). Two of the questions were further clarified based on this analysis to improve the instrument. The KMI achieved an alpha reliability of .89 in this sampling. Based on Barth's typology a series of subscales were computed: information acquisition, document and information creation, document and information application.

Table 1

Alpha Reliability Coefficients of Scales and Subscales of the Knowledge Management Inventory

Scale/Subscale	Alpha coefficient
Knowledge Management Inventory	$\alpha = .86$
Information Acquisition	$\alpha = .70$
Accessing & Evaluating	
Information (and Document) Creation	$\alpha = .79$
Organizing & Analyzing	

Information Application	$\alpha = .71$
Conveying, Collaborating & Securing	

The second instrument, the Multifactor Leadership Questionnaire (Version 5-S) created by Bass (1985), is a 70 item survey consisting of four subscales of transformational leadership acts (charisma, individual consideration, intellectual stimulation, and inspiration), two subscales of transactional leadership acts (contingent reward and management by exception), and one scale measuring laissez-faire leadership. Subjects self-reported specific leadership attributes using five point Likert scales ranging from strongly agree to strongly disagree. The MLQ has been found to be very reliable (Howell & Higgins, 1990a) as either a self-report measure or as a measure of a superior's performance. In the present application the MLQ was used as a self-report of transformational, transactional, and laissez-faire leadership attributes. The reliability scores for the subscales ranged from $\alpha = .84$ to $\alpha = .63$, which are consistent with prior research.

Third, all participants were asked to complete the Acceptance of Technological Innovation scale (Crawford, 1998). The version administered was shortened (20 items) from the original 30 item measure. Though subscales were developed for the original ATI measure, none were computed for this research. Alpha reliabilities in past implementations of the ATI have consistently approached $\alpha = .90$, and in this study the same level was noted, when $\alpha = .91$ was computed.

Finally, several questions regarding basic demographics of the sample were deemed important for this investigation. Subjects were asked to report on the following: age, sex, years employed, education, type of career, use of technology, and position. In the below analyses the only variable used was the position variable where subjects self-rated themselves as entry level,

supervisory level, or upper management/executive level.

RESULTS

Table 2 details the descriptive statistics for each of the variables involved in this study.

Table 2

Select Descriptive Statistics

Variable Name	n	Min	Max	Mean
Innovation	993	27	96	66.98
Transformational	893	89	176	135.49
Transformational - Charisma	941	22	50	36.59
Transformational - Individual Consideration	948	24	50	39.04
Transformational – Intellectual Stimulation	937	21	50	37.34
Transformational – Inspiration	946	14	35	22.77
Transactional	904	44	91	64.90
Transactional – Contingent Reward	923	22	48	34.05
Transactional – Management by Exception	942	16	44	30.84
Laissez-faire	947	10	43	22.62
Knowledge Management Inventory	988	73	140	115.16
Knowledge Management – Information Acquisition	1023	22	40	33.15
Knowledge Management – Info/Document Creation	1014	30	60	48.31
Knowledge Management – Info/Document Application	1028	16	40	33.51

Innovation and Knowledge Management

A strong correlation ($r = .42$, $p = .0001$) evidenced the relationship between innovation

and knowledge management and each of the knowledge management subscales (information acquisition, information/document creation, and information application,). Table 3 displays the results of a regression analysis of innovation in relation to the dependent variable of knowledge management and associated subscales.

Table 3

Regression Results for Innovation and Knowledge Management

	R squared	F	Sign
Knowledge Management Inventory	.174	198.70	.0001
Knowledge Management – Information Acquisition	.134	151.72	.0001
Knowledge Management – Info/Document Creation	.177	208.56	.0001
Knowledge Management – Info/Document Application	.072	76.59	.0001

Transformational Leadership and Knowledge Management

One of the primary goals of this investigation was to assess the relationship between transformational leadership and knowledge management behaviors. The research by Bryant (2003) speculated that knowledge management behaviors may be strongly related to transformational leadership. To determine the extent of the relationship between transformational, transactional, and laissez-faire factors, several correlations were computed. They are detailed in Table 4.

Table 4

Correlation Coefficients and Significance with Knowledge Management

Variable Correlated with Knowledge Management	R Coefficient	Significance
Transformational	.462	.000

Transformational - Charisma	.410	.000
Transformational - Individual Consideration	.407	.000
Transformational – Intellectual Stimulation	.413	.000
Transformational – Inspiration	.196	.000
Transactional	-.053	.121
Transactional – Contingent Reward	.112	.001
Transactional – Management by Exception	-.185	.000
Laissez-faire	-.380	.000

Based on the highly significant correlations, a regression analysis was performed looking at the amount of variance in knowledge management that was accounted for by transformational leadership. The results of that analysis indicates that 19.4% of the variance of knowledge management was accounted for by transformational leadership ($F = 203.09$; $df = 1, 841$; $p > .0001$). A regression model looking at the impact of transactional leadership on knowledge management indicated no significant finding ($F = 2.41$, ns). Finally, the impact of laissez-faire leadership on knowledge management was also explored. The resulting regression model showed that 14.4% of the variance of laissez-faire leadership was accounted for by knowledge management ($F = 150.49$; $df = 1, 889$; $p > .0001$). The highly significant negative correlation indicates that as laissez-faire leadership behaviors increase, the level of knowledge management decreases.

Table 5

Correlation Coefficients and Significance with Knowledge Management – Information Acquisition, Information/Document Creation, Information/Document Application

Variable Correlated with Knowledge Management	Information Acquisition	Information Creation	Information Application
Transformational	.391 **	.422 **	.363 **
Transformational - Charisma	.345 **	.406 **	.326 **
Transformational - Individual Consideration	.372 **	.357 **	.365 **
Transformational – Intellectual Stimulation	.366 **	.402 **	.334 **
Transformational – Inspiration	.187 **	.199 **	.142 **
Transactional	-.032	-.039	-.053
Transactional – Contingent Reward	.097 **	.110 **	.090 **
Transactional – Management by Exception	-.141 **	-.162 **	-.167 **
Laissez-faire	-.321 **	-.365 **	-.307 **

** indicates significance at .01 level

Effects of Innovation and Transformational Leadership on Knowledge Management

The relationship between transformational leadership and innovation has been previously well established in other studies where correlations of larger than .30 have been noted. In the current study a strong correlation between innovation and transformation leadership was again noted ($r = .260$, $p = .0001$). To assess the combinative effects of innovation and transformational leadership on knowledge management a simple regression analysis was performed. Each variable loaded as significant in the model, with the total model of innovation, position, and transformational leadership accounting for 29.4% of the variance of knowledge management ($F = 168.75$; $df = 2, 802$; $p > .0001$).

DISCUSSION

Without question, the results of this study provide ample support for the notion that

knowledge management and leadership, as both a theoretical construct and as an organizational position, are strongly related to each other. Many of the researchers that have theorized about the relationship have lacked empirical data on which to base their ideas, but this study clearly details the link. Researchers like Bryant (2003), Johnson (2002), and Politis (2001) provided the theoretical basis, but without empirical support the relationship was assumed, but unproven.

Among the most specific findings in this research study is the strong relationship between transformational leadership and knowledge management behaviors. The regression analysis provided strong evidence of the causal nature of the link between the two variables. The strong R squared value associated with the relationship suggests that a substantial amount of variance in transformational leadership can be accounted for by knowledge management skills (19.5%). This research finding is certainly parallel with prior research by Crawford (1998, 2000, 2003) that isolated the strong link between transformational leadership and innovation. That set of studies demonstrated that 30.8% of the variance of transformational leadership could be attributed to personal innovativeness. One might reason that innovation, as a personal construct, may be manifest outward through knowledge management behaviors.

Another interesting finding in this present investigation deals with the relationship between transactional and laissez-faire leadership and knowledge management. Due to the technical nature of knowledge management, one might reasonably argue that effective managers need only adopt transactional strategies. Transactional strategies tend to be less focused on the personal development of the followers and more centered on goal attainment. However, this study did not find that to be the case. The only significant findings that related transactional leadership to knowledge management were significant correlations between knowledge management and contingent reward, and a significant negative correlation with management by

exception. The overall relationship between knowledge management and transactional leadership did not approach any level of significance. Given these interesting and conflicting findings, further investigation into the relationship is warranted. This study found that knowledge management was also a strong negative predictor of laissez-faire leadership. This finding, while not surprising, provides further basis for the assumption that knowledge management is more related to active follower-centered leadership. In this model, knowledge management accounted for 14.5% of the variance of laissez-faire leadership. The correlation was negative, demonstrating an inverse relationship between the two.

In an analysis of the role of innovation on knowledge management, the relationship was as expected – strong. Most notably, the relationship between innovation and information acquisition and information creation was strongest. The finding is reasonable given the fact that the innovation measure largely asks respondents about their adoption of technology, as opposed to how they might use technology they had adopted (as is the case in the last subscale). Even the relationship between innovation and information application is very strong. Overall, though the two measures are distinct in their focus, there is nonetheless, convergence in how they are applied since respondents reporting higher levels of knowledge management, on the total measure and the subscales, have already adopted technology. Those lower in the overall measure and the subscales may not have innovated already. More research should be done to flesh out the actual relationship between the two variables, because their unique contribution is essential to understanding the how and why of personal use of technology.

Implications for Leaders

The conclusion here is no different than for many other transformational leadership related findings – transformational leaders are more successful across a variety of organizational

constructs. Findings in the current study strongly support that basic conclusion. Researchers have suggested that it is the person-centered nature of transformational leadership that makes the difference, presumably because of the authentic and ethical nature of the influence relationship (Crawford, 1998; Crawford & Strohkirch, 1997a, 1997b). Additionally, these findings show that knowledge management is not enhanced by transactional leadership, and is significantly slowed by laissez-faire leadership.

These findings are evidence of a growing interest in the relationship between the “high touch” nature of leadership and the “high tech” aspect of the modern workplace. In continuity with prior research, these findings show yet another demonstrated link between person-centered transformational leadership and some technical construct, in this case, knowledge management and innovation. The evidence here is clear – transformational leaders are better suited to handle even the most technical aspects of the modern workplace than are transactional or laissez-faire leaders. Additionally, as individual leaders move up in an organization they are better suited to engage in knowledge management and innovation, at least partially, because they are more transformational in leadership style. Future research needs to more clearly focus on the specific aspects of transformational leadership, position, and knowledge management in a variety of contexts, but the results of this study clearly support the relationship between these variables.

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