This paper is making an attempt to fill the gap in the relevant literature, concerning the role culture plays, in the adoption and implementation of innovation. A model is proposed, relating three levels of culture strength with an organization’s capacity to innovate. The model includes culture strength relationships to the stages of organizational innovation, to innovation types and to the innovation radicalness dimension. A number of testable hypotheses were produced, providing thus room for significant future research.

Key Words: Organizational Culture, Innovation, Strong Cultures, Cultural Innovation, Organizational Performance.

Introduction

It has been two and a half decades since the concept of organizational culture started to appear in management journals. What is the culture of a business? In the words of Gallagher (2003) it is “…your values and beliefs, [it is] generally unspoken, [it is] your style, the types of people you hire, what behaviors you reward.” Culture has been one of the most heavily researched areas in the organization literature, with a multitude of studies investigating every facet of the concept and with the development of a variety of research methods being used in those studies. One of the basic assumptions a large number of scholars are making, is the desirability of a strong culture ( glossary 2005), which is perceived as the prevailing variable explaining high levels of organizational performance (Peters & Waterman, 1982). The largest part of the culture literature has either studied the relationship between culture and performance, or the management of culture change.

The focus of this paper is on the impact of organizational culture, on the organizational innovation process. More specifically, the effects of culture strength will be investigated, on the adoption and implementation of organizational innovation, discriminating between innovation types and stages. Popular books such as “In Search of Excellence”, “The New Corporate Cultures” and “The Change Masters” have made extensive references to the innovativeness of high-performing organizations proposing that strong cultures lead to higher rates of innovation. The performance criteria in these studies, nevertheless, have been strictly financial, so, although a high-performing company could be innovative, the most innovative companies were not necessarily considered successful. Stated otherwise, the causal relationship implied, between culture and the innovation rates of high-performers may be nothing more than the effect of moderator or confounding variables. The financial difficulties of many of the “excellent” companies of “In Search of Excellence” subsequent to the 1982 edition of the book made its authors
publicly acknowledge some of the flaws of the study. (Business Week, Nov. 5, 1984, p.p 76-94)

The absence of direct studies on innovation and culture in the organizational literature is conspicuous. With the exception of the case of R&D and technology related studies (Twati & Gammack, 2006), a paper by Klein, K.J. & J. S. Sorra, (1996) and a study by Nicholson (1990), innovation has not been studied as an organizational process in culture studies. Furthermore, few of the organizational culture studies have tested empirically the theories proposed. The purpose of this paper is to propose a theoretical framework for such an investigation, based on the assumption that there are still unclear aspects of the relationship between the two variables of culture and innovation.

Organizational Culture Definition

The definition of organizational culture has been the subject of a wide debate, and scholars from various disciplines have been drawn to it, offering diverse perspectives (Brown, 1998.). As a result, the term culture came to be used interchangeably with such concepts as values, organizational climate, physical and cultural artifacts, norms or as “the normative glue” pervading organizational action and holding members of a team together (Schneider, Brief & Guzzo, 1996). However, all the above represent manifestations of culture, or various levels of organizational culture, rather than the culture itself (Deshpande & Farley, 2004; Schein, 1999; Dyer, 1986). In this paper, culture will be defined as:

1. The sustained patterns of perceiving, interpreting and acting of organizational members (Carmeli, 2005, Carney, 2006);
2. The set of assumptions that determine the above patterns (Schein, 1999; Geletkanytz, 1997); and
3. What Pettigrew (1979) calls “...the amalgam of beliefs, ideology, language, ritual and myth...” as well as norms, stories, legend and physical artifacts such as buildings and offices.

The comprehensiveness of the above definition makes it useful in many contexts of organizational culture studies. The first part of it, refers to the common way people see things and act in each culture. Wilcow (1989), in her definition of culture talks about “habitual ways of feeling and thinking” shared by all organizational members. These common ways of perceiving, interpreting, and acting are derivatives of the underlying assumptions of the leadership and perhaps a number of other influential agents in the organization. These latent assumptions are typically invisible to organizational members who take these for granted (Schein, 1985; Dyer, 1986). It takes the objectivity of a trained outsider (e.g. a consultant) and the deep knowledge of an insider, to uncover these assumptions in an organization. The assumptions may be beliefs or values of the founder(s) (Kimberly & Bouchikhi, 1995), they may be the solution to a frequently met and solved problem that is now implicitly and unconsciously solved.

Innovation Stages and Types
Innovation has been defined in numerous ways. Thompson (1965) defined it as “the generation, acceptance and implementation of new ideas, processes, products or services”. Zaltman, Duncan and Holbek (1973) consider innovation as something new to the environment rather than the focal organization. Since the focus of this study is the organization rather than an industry, we will define innovation as the adoption of products, services, processes, norms or practices that are new to a particular organization (Damanpour, 1996 a; Daft, 1978). The rationale for the adoption of this definition lies in the fact that, regardless of the impact an innovation may have on the adopting organization, there will always be a certain amount of change internally. The late entry of IBM in the personal computer market, did not lessen the impact on the company’s organizational structure, strategy, systems, etc., than it would have, if the company had entered the market earlier in that market’s life cycle.

It is important for researchers to differentiate between the stages, and the types of innovation (Damanpour, 1988). Different types of culture will probably have varying effects along the two dimensions of innovation on organizations. Damanpour (1988) presented an integrative model of innovation adoption in his study of the impact of organizational variables on innovation. He distinguished between two stages of innovation, i.e. initiation and implementation; two types of innovation, i.e. technological and administrative; and finally on the radicalness dimension, radical versus incremental innovations. An Innovation has been defined as radical by Dewar and Dutton (1986), when “it contains a high degree of new knowledge” as opposed to incremental innovations, which involve improvements, fine-tuning or alternate uses of existing products, ideas or services, “mainly reinforcing existing capabilities of the organization”. (Κανελλόπολος, 1994; Gopalakrishnan, & Damanpour, 1997). A slightly different distinction has been made in this dimension by Christensen and his students, distinguishing between sustaining and disruptive innovation (2003, 2006). The former is defined as an innovation improving a product, service, or, process characteristics and the latter referring to innovations that change industry patterns, or whole industries (Christensen, 2006; Govindarajan, V. & P. K. Copalle, 2006).

The literature differentiates between administrative and technological innovations. Administrative innovations are new programs, policies, rules and procedures adopted by the organization (Kimberly & Evanisko, 1981). Technological innovation is innovation that takes place in the product/market domain, processes and technologies of the organization (Κανελλόπολος, 1995; Damanpour, 1988). A third type of innovation is proposed in this paper, the cultural innovation. This refers to the adoption of new norms, values, symbols and organizational practices such as rituals. The former two types do not appear to capture some of the important aspects of the organizational culture whose impact is just as important in organizational innovation adoption. Finally, on the dimension of the innovation stages, the literature presents a wide variety of numbers of stages. Most studies use the Initiation vs. Implementation stages (Damanpour, 1996 b; Zaltman et al, 1973). Others use more detailed distinctions: Hage and Aiken, for example use four stages, i.e. evaluation, initiation, implementation and routinization (1970, pg. 113).
In this study, the scheme proposed by Hage and Aiken (1970) will be adopted, but the two early stages, evaluation and initiation will be collapsed to one for reasons of simplification (Damanpour, 1988). Since no major difference is expected, the efficacy of the model presented in the following sections will not be affected. The initiation stage will include the idea generation, evaluation and adoption sub-stages. Implementation refers to putting the innovation to use and seeing it work. Finally, institutionalization, the term used here for routinization, refers to the stage of the full incorporation of the innovation to the system. In this stage, the innovation does not simply become routine but it becomes embedded in the existing culture, impacting upon other elements and implicitly or explicitly affecting future activities and decisions.

Having defined all of the major concepts used, the effect of culture on organizational innovation is discussed next.

The Culture Strength Dimension

A large number of studies have presented evidence that strong cultures typically lead to successful outcomes over long time periods (Sorensen, 2002; Dyer, 1986; Deal & Kennedy, 1999; Peters & Waterman, 1982; Ouchi, 1981; Barney, 1986; Cameron & Quinn, 1999). Strong cultures are characterized by extensive socialization effort and especially designed reward systems, through which management can achieve substantial control of organizational members, in the way these members think, act, perceive and interpret information and in terms of these members’ value and belief patterns (Ogbor, 2001; Geletkanycz, 1997; Wilcow, 1989; Pettigrew, 1979). To measure the strength of the organizational culture, one needs to measure the cohesiveness of the culture, i.e. the extent of variability in member behavior patterns, cognitive styles, values and cultural assumptions (Denison, 2003).

It is generally accepted, that strong, cohesive cultures allow a freer expression of member feelings, since the members feel close to one another and can air their frustrations, without fearing irreparable damage in their relationships. However, the intense socialization and the strict adherence to the prevailing norms, can generate individual views and ideas strikingly similar, since both the information perception and interpretation processes have been influenced in a specific direction, by the overpowering organizational culture (Kanellopoulos & Akrivos, 2006; Leavy, 2005; Ogbor, 2001; Wilcow, 1989). Such controlling cultures stifle novel thinking and creativity and limit innovation stimuli perception, to those existing within the boundaries of the organizational members’ perceived environment (Beinhacker, 2006; Lashinsky, 2006).

The perceived environment is only a small part of the environment of the organization. This results to limited exposure of members to the stimuli that can lead to the inception of innovative ideas. Ouchi (1981) proposed that the average member of a Z-type organization, (which is considered to be of high performance) belongs to, anywhere between 8 to 12 groups, inside the organization at all times. Typically, this will limit the person’s participation to outside groups, which can be the source of most innovative ideas (Saxby, G., Parker, K., Niche, P. & P. Dishman, 2002). Strong cultures such as those of the Z organizations in Ouchi’s study, are higher order control mechanisms developed...
consciously or unconsciously by the management, to gain efficiency in implementing decisions, at the expense of innovation (Ogbor, 2001).

Organizational Factors and Culture Strength

Much of the innovation literature has examined the effects of professionalism on organizational innovation (Kimberly & Evanisko, 1981). Professionals have external orientation, they are likely to have a large number of contacts with their peers outside the organization and their professional growth is at least as important to them as are organizational goals. Even though, their participation in professional groups with cultures of their own i.e. occupational cultures, may become a source of anxiety, due to clashing feelings of loyalty between their work and their peer group, the information they receive through their interaction with their peers, outside the organization, is invaluable, since it can result to the generation of large numbers of new ideas, from which innovations can be developed. In strong cultures, Ouchi (1981) posits there is a rather low degree of professionalism. These companies’ professionals read fewer journals, write fewer articles and do not participate much in professional meetings. They are also very likely to exhibit the NIH (Not-Invented-Here) syndrome (1981, page 90). Thinking that they have the best people with the best ideas, they refuse to accept input of external origin. Hippel proposes that “…internal innovators frequently view customer innovators (external innovators) as rivals, who might undermine their creative role” (Shrange, 2006). This can potentially lead to an effective isolation of the organization or the subunit from its environment, which in turn creates the conditions for the development of performance crises. Sooner or later, the organization will have to confront major environmental changes for which it will have done little preparation.

One other variable from the innovation literature is cosmopolitanism. Cosmopolitanism which refers to the number of external contacts a person may have, was shown to correlate also, with innovation adoption (Kimberly & Evanisko, 1981). A problem, however, with this assertion, is that the studies referred to, were based on the scores of CEO’s responses, rather than those of randomly selected organizational members. It is important, however, that again the salience of the external contacts, as an innovation predictor variable, is confirmed.

The above two variables, that is, professionalism and cosmopolitanism, are important predictors of innovation. At the same time, they are incompatible, to a large extent, with strong cultures. Strong cultures demand and obtain complete conformance to the dominant norms and values. Outside group membership such as professional associations, are just as strong an influence to the members’ behavior as the one of the focal organization’s. A clash between professional and company norms or values and goals is inevitable, at least in the long-run (Chuang, Y. T., R. Church & J. Zikic, 2004). In this case, if Festinger’s (1957) cognitive dissonance reduction techniques do not help the person, in the words of Peters and Waterman the member will “... either buy into their norms or get(s) out” (1982, p. 77).
The norms of a strong culture are very “intensive”, permeating all aspects of organization functioning. A strict adherence to these norms is expected by all organization participants. Problems arise when competent individuals cannot give in unconditionally and adapt to all these intensive norms. As a result, these individuals will either leave the organization, in which case the company incurs a major loss in human capital or they may remain in the group, suffering the ensuing consequences, that is alienation, lack of communication, low productivity, low self-esteem and other maladies. The low tolerance for deviation of the strong culture, is effectively suppressing the innovation process. The organization rewards adherence to the norms, rather than pursuing what the individual perceives to be in the best interest of the organization. This is particularly the case with cultures where hierarchy and status are revered. If the organization’s norms value open confrontation and conflict in problem solving, the situation may be reversed. Again however, even with open confrontation supporting norms, the rules of the game remain unquestionable, which in the long-run will prove problem-bearing. Proponents of strong cultures argue that high performing companies in their studies, have also been innovative (Peters & Waterman, 1982; Deal & Kennedy, 1982; 1999). One could think of a few plausible explanations for this. One way of generating innovations is by purchasing patents from others. Another way of producing a large number of innovations is by altering the features of existing products, such as the standing toothpaste. A third and perhaps more plausible explanation is that organizational variables such as size, centralization, specialization, functional differentiation, external integration, formalization, professionalism and others, routinely associated with innovativeness in the literature, may very well explain the high innovation adoption rates of these organizations.

**Figure 1 – A curvilinear relationship of innovation and culture strength**

![Figure 1 – A curvilinear relationship of innovation and culture strength](image)

**Strength of Culture**

However, even if a strong culture values innovation, it would have a difficult time nurturing it, since the notion of “conformity” and the social pressure are embedded in the concept of “strong” cultures. If a culture does not press for conformity it will not remain strong for long, because deviations would be tolerable and this would lead to unpredictable behavior of the organizational members. This leads one to the conclusion that, strong culture and deviation (and creativity) are irreconcilably different and mutually exclusive. One cannot be ordered to be creative, regardless of whether the order comes from individuals or collectivities, in the form of direct order or a strong organizational norm. The relationship between strong cultures and innovation rate is summarily resented.
in the figure above. The innovation rate increases as the culture becomes stronger, up to a point. Beyond that point, a stronger culture will have an adverse effect on innovation adoption. Formally stated, our first hypothesis is, 

**H1: There is a curvilinear relationship between the strength of culture and innovation.**

**Culture strength levels**

Three levels of culture are proposed, along its strength dimension; the “strong”, the “moderately strong” and the “weak” cultures. Table 1 succinctly presents a number of characteristics of each of the three culture strength levels. The list, though it provides some information about the cultural strength levels, it is by no means exhaustive and it can be enlarged.

**Strong Cultures**

Previous sections of this paper focused on the problems a strong culture may entail for an organization. The discussion has thus far pointed out, the fallacy of the perception of innovative organizations as being characterized by strong cultures. In this section, a number of characteristics of strong cultures will be presented, to help in developing a model and hypotheses, related to that model. One way of measuring the strength of a culture, is by counting the number of groups or associations, formal or informal, a member is affiliated with, within or outside the organization. Also, the relationships of members with individuals, inside or outside the organization, may provide an indication of the degree of the cultural influence on each member. It is expected that strong organizational cultures will foster intense participation in several groups inside the organization (Ouchi, 1981) and will even dominate members’ relationships outside the organization. That means, the social environment of a member of a strong culture will comprise, to a large extent, of work-related people and activities and the organization’s effect will be pervasive in the member’s interests, attitudes and perspectives.

![Table1. Characteristics of Strong, Moderately-Strong and Weak Organizational Cultures](image-url)

<table>
<thead>
<tr>
<th>Culture strength level</th>
<th>Strong</th>
<th>Moderately Strong</th>
<th>Weak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Inside group Memberships</td>
<td>Many</td>
<td>A Few</td>
<td>None More than Required</td>
</tr>
<tr>
<td>2. Outside group Memberships</td>
<td>Few if any</td>
<td>Many</td>
<td>Varies among individuals</td>
</tr>
<tr>
<td>3. Effect on Extra-Organizational life</td>
<td>Profound</td>
<td>Noticeable</td>
<td>Non-existent</td>
</tr>
<tr>
<td>4. Effect on Activities,</td>
<td>Profound</td>
<td>Noticeable</td>
<td>Non-existent</td>
</tr>
</tbody>
</table>
Interests, Perspectives

5. Shared Values                      Most                  Several                  Few
6. Norm Intensity                    Strong                Moderate            Weak
7. Shared Cultural Assumptions       All Shared         Many Shared        Few Shared

One rather common practice, among American companies, is hiring people from remote places and then creating the mechanisms to induce socialization among members. In short time, these companies create strong cultures with all the consequences following that. A similar example is the practice of companies moving into small towns, thus affecting every aspect of both the work and social life of members (Deal & Kennedy, 1982). Other companies go as far as building cities, for example Toyota City, the repercussion of which, for the members and the organization are obvious, in light of the preceding discussion.

Moderately Strong Cultures

This type of culture is expected to have some influence on members’ attitudes, preferences, or even their social environment outside the organization. The focus organization however will have an arduous task in competing with other outside groups, influencing the individual during his/her time outside the organization. Loyalty to other groups and membership in the focal organization, may determine a large part of the person’s attitudes, behaviors and interests (Saffold, 1988, Sorensen, 2002). In fact, with some members, identification with the organization ceases to exist the moment they exit the organization’s gate. This however, is more the case with the weak cultures. The role the organization plays in forming its members’ culture, is a minor one (Martins & Terblanche, 2003), focusing on providing broad guidelines, within which, members are free to act, think and behave.

Weak Cultures

Weak cultures make no significant effort, or at least not an effective one, to create the sense of “groupness” or collectivity in their employees. People will do what the task assignment requires and no effort will be made to engage in social relationships unless attraction forces them to do so. Their interests, values, goals and perspectives will be highly diverse and the organizational influence over their external lives will be near zero. These cultures are described as fragmented in the Goffee & Jones (1998) typology, or as the cultures of the individual in the Handy typology (Μποροπάντας, 2005; Παναγιωτοπούλου, 1997). Deal and Kennedy (1982:135) defined weak cultures as follows:

“1. Have no clear values, or their values may be conflicting without any of them standing out;
2. different parts of the organization have fundamentally different beliefs;
3. the heroes don’t build upon a common understanding as to what is important;
4. the rituals of day to day life are either disorganized or conflicting.”

A Cultural Model of Innovation

After having defined all aspects of innovation and having described the three culture strength levels, we can now introduce our model (see Tables 2, 3, 4). Daft proposed his Dual Core model of innovation adoption, positing that technological innovations originate in the lower organizational strata, while administrative innovations are introduced by administrators, whose expertise lies on issues of administration (1978:180). Given the findings of Kimberly & Evanisko (1981), on professionalism and innovation, those of Kaluzny, et al. (1974, cf, in Kimberly & Evanisko, 1981), on cosmopolitanism and Dewar and Dutton (1986), on diversity of knowledge or differentiation and in line with the proposition by Martins and Terblanche (2003) that innovation is the result of “chaos within organization guidelines”, the following relationships can be expected:

H2: Strong cultures will be inversely related to administrative, technological and cultural innovation.

Table 2. Culture Strength and Innovation Type

<table>
<thead>
<tr>
<th>Culture strength level</th>
<th>Administrative</th>
<th>Technological</th>
<th>Cultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moderately Strong</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Weak</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

It is discussed in previous sections that, lack of external contacts (low level of professionalism, diversity of knowledge and perspectives and low cosmopolitanism) will lead to lack of new ideas and furthermore, the intense norms for conformity further exacerbate the problem. The multiplicity of inside group memberships, the lack of outside links, and the shared cognitions of organizational members, will hinder the inflow of information, which will stifle administrative and technological innovations. The low tolerance for norm deviation and thus low risk taking and the active reinforcement of the prevailing organizational values, will hinder the adoption of cultural innovations such as the adoption of new rituals, or new “ways of doing things”, when these innovations are not in complete consonance with those values.
**H3: Moderately Strong Cultures will relate positively to the adoption of all three types of innovation**

The rationale for this hypothesis again, lies in that, the characteristics of moderately strong cultures, described in Table 1, make these organizations more conducive to innovation adoption. High levels of professionalism and differentiation will be associated with the adoption of technological and cultural innovations while management cosmopolitanism and professionalism, will provide impetus for administrative and cultural changes.

Finally, weak cultures are expected to have low technological innovation rates due to the lack of internal communication, which was found to be very important by Baker and Freeland (1972:105). Even a moderate amount of internal communication would increase innovativeness, since the members maintain external contacts. The two authors found that scientists attributed 49% of their information sources on interaction with others. Lack of such interaction will lead to lower levels of idea “cross-fertilization” which is a major innovation determinant. Administrative innovation adoptions again are not expected to be at high levels since the organization is disintegrated and it will not be able to generate or implement new ideas. It is very likely, however that weak cultures relate positively with cultural innovations. New people entering the organization will bring new norms, values, rituals, etc. to the company, which may be adopted and implemented for a short time. In the long term, however, no norms are expected to last in a weak culture and if they do last, they will be ineffective since there will be no punishment for deviation or little reward for adherence. An exception to the statement above may be some high technology companies which, according to Shona Brown, may be highly successful in generating innovations, in spite of their “chaotic cultures” (Lashinsky, 2006). Lashinsky, explains how Google company culture, characterized by “disorder, disarray and uncertainty” manages to be as successful as it has been. Thus,

**H4: Weak cultures will relate positively to cultural innovation and inversely with administrative and technological innovation.**

**Strength of Culture and Stages of Innovation**

A different impact of the strength of the culture is expected on innovation stages. Strong cultures through pressure for conformity and by insulating themselves from their environment will generate less innovative ideas. However, if they do conceive an innovative idea, it will have a higher probability of being implemented than in the case with the other two culture strength levels. The high goal congruence and the common way of perceiving and interpreting information will make it easier to reach agreement and obtain the cooperation of the people required of successful implementation. Hambrick et al (1996) found that homogeneous groups (stronger top management cultures) in a study of the USA airline industry were better at deciding and implementing their decisions while heterogeneous top management teams (less strong cultures) were less good at implementing but better “at creating”. The findings by Hambrick’s et. al. were supported also in a study by Martins and Terblanch (2003). Institutionalization also will be more
effective, since the innovation will be incorporated in the company’s repertoire of problem solutions. Therefore:

**H5:** Strong cultures relate inversely with the initiation stage of innovation but positively with the implementation and institutionalization of those adopted.

Moderately strong cultures will have an easier time initiating innovations, due to their networks with their environments. Since the value and goal congruence is not as high as is the case with strong cultures, people will be more difficult to persuade to sign on to a new venture. The effects at the institutionalization stage are similar. However, due to the large number of innovations initiated, the total number implemented and institutionalized will be greater than in any of the other two culture strength levels. Thus,

**H6:** Moderately strong cultures will have proportionately more initiated innovations but a smaller proportion of them will be implemented and institutionalized than in strong cultures.

Again the point should be made, as Hage & Aiken, (1971, cited in Pierce & Delbecq 1977) propose, that the absolute number of innovations implemented and institutionalized will be greater in medium strength cultures. Weak cultures are expected

<table>
<thead>
<tr>
<th>Table3. Culture Strength and Stages of Innovation</th>
</tr>
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<tbody>
<tr>
<td><strong>Culture Strength</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Strong</td>
</tr>
<tr>
<td>Moderately strong</td>
</tr>
<tr>
<td>Weak</td>
</tr>
</tbody>
</table>

to have a small number of initiated innovations perhaps similar to that of strong cultures (an exception here would be strong cultures that value innovation) but far less innovations will be implemented and even fewer institutionalized. Again, the reason is that lack of internal communication, a minimal goal congruence and value dissimilarity, greatly outweigh the benefits of external contacts. Therefore:

**H7:** Weak cultures will rate low in all three stages of the innovation process.

**Strength of Culture and Innovation Radicalness**

This innovation dimension is particularly important for a number of reasons. A radical innovation may create value conflict, in which case it will be very difficult to adopt
or implement it. It may also provoke active resistance from other members whose reaction to an incremental innovation proposal would have been plain indifference (Σαχτινίδης, Ποζιός και Μπινιώρης, 2005). It may call for replacement of something that has been valued for a long time and is part of the company culture (Σαχτινίδης, 2006). Another problem with radical innovations is the uncertainty their adoption creates to organizational members. However undesirable, radical innovation becomes imperative in rapidly changing times. As Geoffrey (2006) suggests, business models today last three to four years, making it impossible for a company to survive if it does not change radically. Table 4 shows the relationships between the types of culture and the amount of radical ness of innovation.

<table>
<thead>
<tr>
<th>Culture Strength</th>
<th>Radical Innovations</th>
<th>Incremental Innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Low Rate</td>
<td>Moderate Rate</td>
</tr>
<tr>
<td>Moderately strong</td>
<td>High Rate</td>
<td>High Rate</td>
</tr>
<tr>
<td>Weak</td>
<td>Low Rate</td>
<td>Low Rate</td>
</tr>
</tbody>
</table>

Radical innovations would be less frequent in strong cultures, since these are intensely self-perpetuating and self-reinforcing. An introduction of a new idea must be a continuation of an existing one. The elements that would bring a radical departure from the prevailing methods and practices are simply absent from strong cultures. The relationship however of strong cultures with incremental innovations is expected to be moderate. Again the intense internal communications, but the absence of environmental input will produce a fair number of incremental innovations. Therefore,

**H8:** Strong cultures are expected to exhibit an inverse relationship with radical innovations and a moderate relationship with incremental ones.

Moderately strong cultures on the other hand, will be more conducive to radical innovations, as well as the incremental ones. Their flexible norms, their exposure to more diverse information, as well as their lesser commitment to the focal organization, would make them more receptive to radical innovations and less defensive overall, when tradition is violated. It follows then that:

**H9:** Moderately strong cultures will exhibit a greater number of both radical and incremental innovations compared to strong and weak cultures.

The latter, as indicated in Table 4, are not expected to adopt large numbers of either radical or incremental innovations. Radical innovation will not have enough support to be implemented and they would only be adopted when the environment demands it. Incremental innovations also are not expected to reach high rates again due to the problems of internal communications and value conflicts. It is probably more likely that
only the few innovations will be adopted, that certain individuals (for example mavericks, or teams working in their own interest), or management will provide impetus for will be adopted (Leavy, 2005). Then:

**H10: Weak cultures will have low rates of radical and incremental innovations.**

**Implications of the Model**

This study has attempted to demonstrate that the widely shared belief of strong cultures being more innovative than less strong ones, is not well founded and deserves little merit. Healthy cultures appear to be more innovative, across the spectrum. It is expected that the model will be applicable in intra-industry comparisons, but it would probably be less useful in comparing organizations representing different industries, say a high technology firm with a low technology one.

Managers should be aware of the strength of their organizational culture. It is particularly important to maintain a healthy culture in environments where innovation is vital. Such environments are technology intensive industries, where technological innovation in particular is quintessential. Low technology industries can also benefit from innovation, but to a lesser extent. It is important, however, for every organization’s long-term performance, to create and maintain cultures conducive to innovation and creativity, regardless of what environment they operate in, if they are to stay in sync with their environment.

The implications for researchers are also significant. The complexity of the simultaneous consideration of the three innovation dimensions and the culture strength dimension (a 3X3X3X2 matrix), allows little space for such an enterprise. Relationships, however, between and across these dimensions can provide valuable insight in the innovation – culture interface. Methodologies can be developed that can solve existing problems. One such problem is the use of a dichotomy in the radicalness dimension of innovation. It would probably be better if one were to use a 5-point scale and assign a number to each innovation from 1 for least radical to 5 most radical. This would be a better indicator of the innovativeness of a firm, because an organization with two number 5 innovations is certainly more innovative than one with four, number one innovations. Yet, using the method most studies use, one would say that the latter organization is more innovative. Finally, an empirical testing of the model will ascribe to it its real utility. Even a perfect model is only an approximation of reality, and has little value until tested.

**Conclusion**

A number of testable hypotheses were generated, stating expected relationships between three levels of culture strength – strong, moderately strong and weak – and three dimensions of innovation, namely, radicalness (i.e. radical vs. incremental), stage (initiation vs. implementation) and type (i.e. administrative, technological and cultural). The main conclusion is that, there is a curvilinear relationship between the strength of
culture and organizational innovation. The optimal level of culture strength in the terms of innovation, is the level of the moderately strong cultures. These cultures are expected to be associated with higher rates of administrative, technological and cultural innovations and are expected to exhibit higher performance in the long-run, than organizations with strong and weak cultures.

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