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To cite this article: George R. Harper & Dawn R. Utley (2001) Organizational Culture and Successful Information Technology Implementation, Engineering Management Journal, 13:2, 11-15, DOI: [10.1080/10429247.2001.11415111](https://doi.org/10.1080/10429247.2001.11415111)

To link to this article: <https://doi.org/10.1080/10429247.2001.11415111>



Published online: 16 Apr 2015.



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ORGANIZATIONAL CULTURE AND SUCCESSFUL INFORMATION TECHNOLOGY IMPLEMENTATION

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Abstract

Information technology has been the catalyst for the new source of economic wealth during the current economic period called the Information Age. Some industries and specific organizations have successfully implemented numerous information technologies and, as a result, enjoy great competitive advantages. Others have not. This article explores whether the internal environment enjoyed by an organization contributes to this success or failure. It also investigates whether the organization's cultural climate and its balance of concern for production issues vs. people issues play a role in implementation success. Data from this 3-year study of 18 companies involved in government and commercial ventures suggest a correlation between specific cultural attributes and the successful implementation of information technology systems. We found that people-oriented rather than production-oriented aspects exerted the most significant influence.

Introduction

Information technology (IT) has become the generally accepted umbrella term for a rapidly expanding range of equipment, applications, services, and basic technologies that process information. These elements of IT fall into three principal categories: computers, telecommunications, and multimedia data (Keen, 1995). Across an organization, thousands of these building blocks can be combined in many ways to create the total IT resource.

History. During the 1980s, companies began a trend of increasing investment in IT. This massive growth in IT investment continues today as IT has become less expensive, increasingly portable, more completely integrated and interconnected, and more embedded in an increasing number of devices and systems (Quinn and Bailey, 1994). However, despite such obvious and dramatic changes in the economy brought about by this massive growth in investment in IT, the growth of non-farm business productivity has not kept pace (Crutsinger, 1997). Many companies are experiencing a huge learning curve and an initial drop in productivity as they attempt to initiate and employ new IT initiatives.

If one asks how IT might be successfully applied to enhance performance and increase productivity, a long list that embodies many aspects of the organization begins to develop. These aspects include an organization's human relationships, policies, strategies, controls, and internal/external organizational relationships. One common thread that has been shown to greatly affect each of these organizational aspects is the widely shared and strongly held values that underlie and define an organization's culture.

Goals of This Research. Our research goals were twofold: to investigate if a correlation existed between a company's success at implementing IT systems and the extent to which the company's culture supports the development of the employee in effectively contributing to the accomplishment of the organization's goals and mission, and to validate a related assumption about organizational culture and the successful implementation of IT systems.

The 3-year study produced data on 18 companies involved in government and commercial ventures (Exhibit 1). Each company had recently implemented a significant IT system to improve productivity. The sample included small and large companies, with a small company defined as having fewer than 400 employees.

Research Methodology

An Organizational Culture Assessment Tool. The cultural set utilized in this research is a modified attribute set based on the organizational cultural profile (OCP) instrument developed by O'Reilly et al. (1991). It consisted of 54 attributes that defined the culture. The cultural style was plotted on a grid similar to Blake and Mouton's (1964) managerial grid. The vertical axis gauged the degree to which an organization's culture exhibits concern for *people* attributes (i.e., fairness, collaboration with others, enthusiasm for the job, trust), and the horizontal axis represents the degree of cultural concern for *production* attributes

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Exhibit 1. Summary of participating companies

Company	Size ^a	Industry
Bechtel Jacobs, LLC	L	Engr/Design/Const.
BellSouth Mobility	S	Telecommunications
Data Systems Research and Development	S	IT—R&D
Department of Energy (ORO)	S	Federal Agency
GTE, Inc.	L	Telecommunications
Home Depot, Inc.	L	Hardware/Building Supplies
Lockheed Martin Energy Systems	L	Nuclear Weapons Mfg.
M-K Ferguson, Corp.	L	Engr/Design/Const.
Motorola, Inc.	L	Telecommunications
Nippondenso, Inc.	L	Automotive
Parsons, Inc.	L	Engr/Design/Const.
Q-Systems, Inc.	S	IT—Software Services
SAIC (ITS Program)	S	IT Services
State of Tennessee (Employment Security)	L	State Agency
UT-Battelle (P&E)	L	Government R&D
Valuepage, Inc.	S	Telecommunications
Worldwide Computing Services, Inc.	S	IT Design

^aL, large; S, small (fewer than 400 employees).

(i.e., compliance, risk-taking, precision, competition). Within each of the five major orientations of the managerial grid, specific cultural attributes were mapped against the cultural implications developed for those orientations, to create a cultural attributes grid (CAG).

The five grid positions from the managerial grid were used to identify the cultural styles on the CAG. A position of (9,9) on the grid is the teamwork position and indicates that the organization has a high level of concern for both people and production issues. This is seen as the optimal position, because the organization is seeking the best possible answer by having everyone involved. The (9,1) position holds that this type of organization has a high level of concern for production issues but a low level of concern for people issues. This is an authoritarian-type culture. The (1,9) position defines the country club culture, where people issues are the focus to the exclusion of production issues. The assumption here is that happy workers are productive workers. A compromise cultural style describes the (5,5) position. Organizations of this type try to balance the necessary evils across the organization in an equitable manner. The (1,1) position defines the dangerous style of basic abdication, that of having little concern for people or production. The strategy in this type of organization is to not make mistakes, which is accomplished by not doing very much.

Each organization was placed on the grid comparing people concerns to production concerns. Next, a determination was made as to where each organization fell with regard to the managerial grid. Once determined, this cultural style was compared to the

degree to which IT had been successfully implemented within the organization.

IT Success Scoring. This research utilized an IT profile (ITP) instrument to measure the degree of success a company has enjoyed as a result of employing IT systems. This instrument is a slightly modified version of a similar instrument developed for a study commissioned by the Computer Science and Telecommunications Board of the National Research Council in 1991 (National Research Council, 1994). The ITP looked at a number of IT implementation areas (subcategories) across the company, including overall IT payoff, strategy, types of IT investments and evaluations of each, structural influence of IT, user involvement, performance metrics utilized, primary causes of failure, and IT benefits not captured by program measures. An average ITP score was assigned to each organization, and assessments could then be made as to what attributes in the culture affected IT success.

Survey Administration. Software versions were created for both the OCP and ITP survey instruments. The OCP survey instrument was distributed primarily by electronic mail. Completed survey instruments were returned in like manner. Over 600 OCP survey instruments were distributed across 17 companies. Participating companies differed by size, industry, and familiarity with IT.

Once a company had begun to participate in the research study, the ITP was sent to a smaller group of individuals within that

Exhibit 2. Summary table of correlation

Correlation	P value
ITP score & concern for people attributes	.95
ITP score & concern for production attributes	.19

company who were familiar with their company’s IT system history. Over 60 ITP questionnaires were distributed across the 17 companies. Individuals participating in the ITP survey included the corporate information officer, computing and telecommunications managers, IT program managers, etc. Once these individuals had completed the ITP survey instrument, they took part in personal interviews, which were conducted to confirm and clarify the answers to the questionnaire.

Research Results

Discussion of Data. The OCP and ITP survey instruments provided the initial data for this research. The ITP survey instrument provided an overall average IT success score for each company, as well as similar data sets for each of the IT subcategories mentioned earlier. Since each OCP value was determined to be either people or production oriented, an average score was derived for each participating company along both of those parameters. These subcategory scores were plotted and conclusions were drawn. A multivariate clustering analysis was also conducted for the data. In analyzing the data, an alpha value of 0.05 was used to assess the scoring and correlations.

OCP People- versus Production-Oriented Attributes and Successful IT Implementation. We found that while an organization’s average OCP people-oriented values were linearly related to the successful implementation of IT, an organization’s average production-oriented values were not. A positive correlation coefficient of 0.95 was calculated for the ITP success score and the OCP average value for people-oriented attributes,

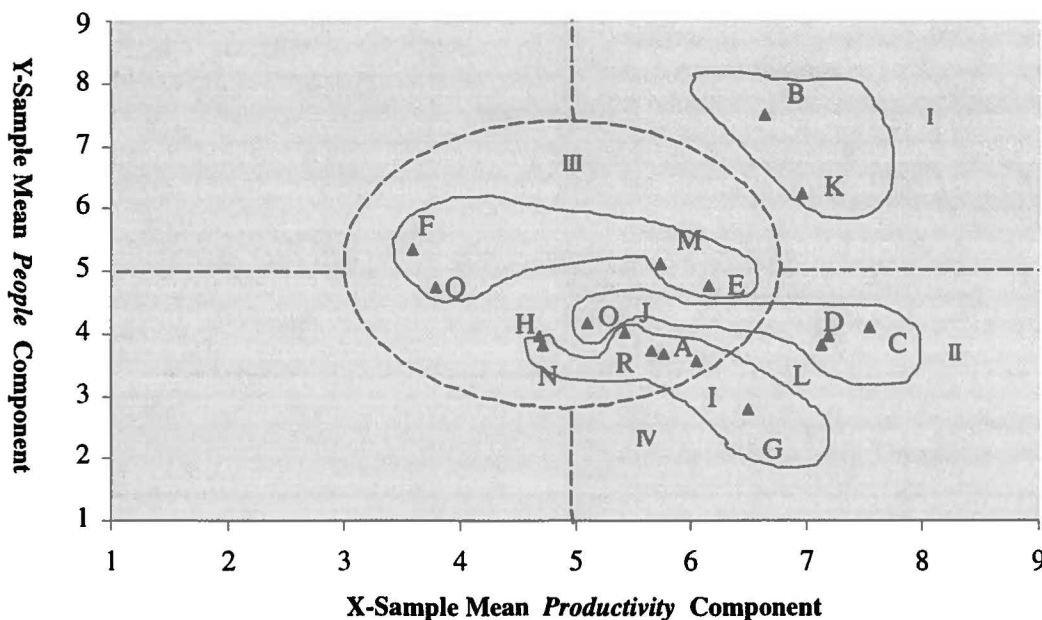
while a correlation coefficient of 0.19 was calculated for the ITP success score and the OCP average value for production-oriented attributes (Exhibit 2).

An analysis of the mean scatter plots for each participating company (Exhibit 3) provided further confirmation of this result. Companies B and K (letter names were assigned to maintain anonymity) both plotted in the (9,9) position of the CAG, had high productivity and people components, and were the most successful companies implementing IT systems. Companies D, C, L, and G all plotted in the (9,1) position. These companies had a high productivity component but a lower people component, compared to the (9,9) organizations. As would be expected, the overall IT success scores for these companies in the (9,1) position were lower than those of the (9,9) companies. Companies F and Q fell closest to the (1,9) position. The remaining companies, when plotted on the grid, fell into the (5,5) position.

In trying to determine if a particular cultural style was more successful in implementing IT, an observation was noted. As the people component dropped, so did the IT success scores. Companies F and Q plotted near the (1,9) position. While their production component was much lower, the people component was higher than for the (9,1) companies mentioned earlier. The overall IT success score for the (1,9) companies was higher than that of the (9,1) companies. The overall success scores for IT implementation for companies F and Q were second only to those of companies having (9,9) culture profiles.

This was further supported by the multivariate clustering analysis also illustrated in Exhibit 3. Here the results of the clustering analysis showed the dashed groupings of the scatter plot. The horizontal nature of the clustering and average ITP success scoring associated with each cluster indicates that the (9,9) cultural orientation provides the highest probability of successful IT implementation, followed by the (1,9)-oriented cultures represented in cluster III, which had the next-best IT success scoring average. IT success scoring averages were as follows: cluster I, 54.9; cluster II, 30.8; cluster III, 35.3; cluster IV, 25.7. The clusters showed evidence to suggest that as the people

Exhibit 3. ITP success scoring by cluster



component decreased, so did the ITP score. The production component was much more independent and had much less effect on the ITP score. The people component dominated the successful implementation of IT.

Specific Cultural Attributes and ITP Success Scoring. In order to determine which specific cultural attributes contributed to the most successful IT implementation, correlation coefficients were computed for each of the 44 cultural attributes and the overall success scores for IT implementation. The analysis revealed a number of cultural attributes that had a positive correlation greater than 0.50 with the successful implementation of IT systems. The list, in descending order, included:

- autonomy
- trust
- team-oriented work
- flexibility
- sharing information freely

Likewise, a number of cultural attributes were shown to hold a negative correlation of greater than -0.50 . This list, in descending order, included:

- rule orientation
- compliance
- carefulness
- preciseness
- predictability

Discussion of the Research Results

Such research results lead to the following issues addressed by companies successfully implementing IT systems:

- Organizations successfully implementing IT systems seem to understand that it is important not only that employees have the proper tools to perform their job, but also that they be given the *autonomy* to decide how and to what extent to utilize those tools.
- The cultural attributes *fairness* and *trust* were found to be more positive in (1,9) and (9,9) companies than in those of other cultural orientations. Perhaps employees in such organizations are encouraged to become more involved in IT implementations. They feel valued for their opinions and trusted to do a good job. Since people are critical sources and integrators of information, it

is critical that workers be included in any successful IT implementation. Information systems are most valuable when given context and interpretation by human interaction.

- *Teamwork*, a newly identified motivator from Utley's (1995) research, appeared to be especially present in the cultures of companies successfully implementing IT systems. Group decision-making and group actions may provide a key leverage point in gaining the acceptance of IT systems as well as in bringing more people and ideas into the implementation process.
- Successful companies also realize that in order to gain maximum benefit from IT tools, it is important that the tools be modified or manipulated for the best possible results. The organization must contain enough *flexibility* to accommodate a shift in planning or technical retooling that provides success.
- Organizations successfully implementing IT systems seem to value the *free flow of information* between individuals and groups more than less-successful ones do. Creating information flows throughout the organization that minimize contradictory interpretations of information retrieved from others is paramount. Peters and Waterman (1982) define it as the basic control mechanism in excellent companies. It is not a chain-of-command control system wherein nothing happens until the boss decrees action. General objectives and values are set forth and information is shared so completely throughout the organization that people know quickly whether or not the job is being performed efficiently, effectively, and accurately.

It is important to focus not only on existing cultural attributes that promote successful implementation but also to identify cultural attributes that would slow or halt success. This is evident from the number of moderately negative-correlated cultural attributes that contribute to the best-fit data. For example:

- Rigid *rules* may govern how employees and groups within the company think about information.
- If information threatens established lines of authority (*compliance*) or financial resources, it will not be shared easily.
- An organization that is overly *careful* and *predictable* would be less likely to indulge in experimenting with new IT initiatives, particularly if that technology might encourage change.
- Organizations with these cultural attributes seem to have a more difficult time changing people-oriented programs such as training, incentive, and supplier/customer relations systems to the degree that might be required in an IT implementation.

Exhibit 4. IT implementation tips

IT implementation tips

Do not have an overreliance on IT methods and techniques, nor view such systems as a short-term panacea.

Be careful to develop a level of autonomy that supports employees and gives them a sense of mission.

IT initiatives should be treated as business initiatives. The organization must have sufficient flexibility to allow for appropriate technical and business plan retoolings.

Understand that any new IT system is of little use if it is not accepted and utilized. Making an assumption that different divisions, departments, or individual employees will want to use it may be the first mistake. Independent business units may be unaccustomed to sharing information or coordinating with other divisions. Teamwork within the organization and the trust of the employees are most important in gaining widespread acceptance of the new IT tools.

Conclusions and Tips for the User

Taking stock of how successful companies implement IT, a method can be developed related to how these organizations approach the implementation of IT systems. Exhibit 4 provides several tips to use as a guideline when establishing any IT implementation initiative.

As these tips point out, changing existing or introducing new IT systems will not, in and of itself, guarantee successful implementation. Companies should also consider the relationships between the IT initiative and the way it will interact with the existing organizational culture. By looking at this relationship as the organization's information culture, a company can measure and examine those people-sensitive attributes that seem particularly important to success. IT implementations can be leveraged utilizing those attributes that are already strong, and business plans can be developed to strengthen weak attributes.

In essence, an organization's culture should be ideally balanced with both people and productivity components. However, the organization culture *must* adequately address appropriate human behavioral elements to successfully implement IT systems. One should identify the attributes of the existing culture and then begin the process to lessen or remove those cultural attributes that prevent or slow successful IT implementation, while establishing organizational cultural attributes that support successful IT implementation.

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