Implementation of Quality Management Systems Under MIF's ISO Cluster: Does it make a Difference?

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I. BACKGROUND

In February of 1999, the Multilateral Investment Fund (MIF) management presented to the Donor's Committee a paper entitled, "Program of Assistance to Small and Medium Enterprises in the Promotion, Implementation, and Certification of ISO Quality and Environmental Management Systems," (MIF/GN-51) introducing the concept of using quality and environmental management standards (ISO 9000/14000) to enhance the competitiveness of small- and medium-sized enterprises (SMEs) in the region. In April of 1999, the MIF contracted International Executive Service Corps (IESC) to conduct a desk study on the status of ISO implementation in the region, including an overview of the standards institutions and relevant actors. On November 18 and 19, 1999, the MIF hosted an international conference entitled, "Enabling Enterprise Competitiveness in Latin America and the Caribbean through ISO Management System Standards," in collaboration with SDS and UNIDO. The Conference had the dual effect of providing guidelines and illustrative models for technical cooperation projects and promoting the Program.

In the month following the ISO Conference in Washington, more than 200 electronic mail requests for information on the ISO Program were received. In the months from January to July 2000, the MIF Office received 46 formal proposals from 14 countries. To arrive at the pipeline for this cluster, MIF in collaboration with the Inter-American Development Bank (IADB) reviewed and assessed the 46 proposals and determined that 12 of the 46 met the conditions for eligibility of grant funding established in the ISO Program guidelines. .

All projects in this cluster address the two main objectives: (i) to achieve measurable improvements in business performance of SMEs in the region through the implementation of international standards and (ii) to create and/or strengthen institutional capacity in standards, certification and accreditation necessary for advancing SME competitiveness. The projects in the pipeline include an important mix of components and technical assistance activities that aim to:

- Raise awareness of the importance of international standards among the small and medium enterprise sector;
- Develop local consulting and training capacity in ISO system implementation and continuous improvement for the SME market;
- Facilitate the implementation of ISO and other international standards; and
- Strengthen institutionally the local accreditation capacity to facilitate mutual recognition of ISO certificates.

This report summarizes the results of an analysis of the impact of the cluster projects on firm management. The analysis was conducted by The Lexington Group in 2004 based on data gathered from the companies in 2003-2004. It follows up on a similar report prepared the previous year. The data gathering instrument was substantially revised and simplified for 2004 to address low response rates and the absence of trend information in

2003. In the sections that follow, we first summarize the key findings of the analysis. We then describe the methodology and provide more detailed analysis of the 2004 results.

II. KEY FINDINGS AND NEXT STEPS

The overall results of the analysis suggest a both important accomplishments and opportunities for improvement. As described in greater detail in the remainder of this report, the following are the key conclusions of the analysis:

- ***Appropriate management systems are being put in place:***
  - Management system strengths include: senior management involvement, designation of the senior management representative, pervasive distribution of quality responsibility, use of audits.
  - Opportunities for improvement exist in more operational areas: use of implementation committees, compensation for quality performance, training, tracking quality performance using performance indicators.
- ***Firms are realizing important benefits from putting quality systems in place:***
  - The major benefits relate to firm image, client relationships and employee satisfaction. Reduced costs are somewhat less frequently cited,
  - The major costs are labor rather than cash outlays: consulting costs, staff time and training are more important than physical equipment costs.
  - Management support was the most frequently cited support,
  - The requirement for staff time was the most frequently cited obstacle.
- ***Firms are improving their performance by putting systems in place:***
  - Nearly 60% of firms report very high or high performance improvements,
  - Improved customer relations rather than cost savings outcomes were the most frequently cited performance improvements,
  - The single most frequently-cited change due to system implementation was employee participation.
- ***Participating firms are very satisfied with the cluster projects:***
  - 93% would recommend participation in the project to others,
  - The major reasons for satisfaction are: improved quality, customer satisfaction, support received from the project and employee motivation.
- ***Market pressure and time in implementation correlate to performance.***
  - Very high performing firms are nearly twice as likely as low performing firms to be subject to strong market pressures and nearly three times as likely to have been in implementation more than two years,
  - Very high performing firms are four times as likely as low performing firms to be highly satisfied with their participation in the projects.

This analysis, as well as a separate analysis of project performance undertaken by MIF, suggests some important next steps:

- ***Increased ownership of the database by the projects.*** The projects must see the value to them of the data and take ownership of the analysis. This can be accomplished by integrating the projects in modifications of the data gathering instrument to address their needs and by including them in the analysis of the results. Ultimately, the projects should decide what they want from the database.

- ***Wider scale implementation:*** Over 40,000 firms were contacted about quality management**,** but fewer than 500 are in implementation. This disparity suggests that an enormous implementation challenge lies ahead if the cluster projects are to have a real effect on SME competitiveness in Latin America,
- ***Use of references from highly satisfied firms to promote the projects.*** The very high degree of satisfaction with the projects suggests that a strategy based on testimonials from satisfied participants could be very effective in inducing additional firms to implement quality programs,
- ***Greater emphasis on the operational aspects of quality management.*** The "systems" elements of quality management systems (procedures emphasized in the ISO standards) are in general well-developed. Operational elements are somewhat less well-developed. Particular areas for greater emphasis are the use of indicators for tracking quality performance, provision of awareness and competency training, use of multifunctional, implementation committees and linking quality performance to compensation.

The MIF Performance Indicators database can be a continuing source of innovation and learning. The results presented in this report are based on a sample of 134 respondents. While some conclusions can be reached from this sample, more robust conclusions could be obtained with more extensive data. Given that the key tasks of developing and streamlining the questionnaire and the database have been completed, the relatively small additional effort to ensure firms respond to the questionnaire and to maintain the database is easily justified. Among the questions that could be analyzed with additional data are:

- ***Does certification make a difference?*** This analysis grouped firms by the time in implementation. Similar analysis could be undertaken differentiating firms by:
    - Whether they have or not been certified or whether they do or do not intend to obtain certification and
    - Their current stage of implementation.

  These analyses could suggest whether certification and various steps leading to certification make a difference to the performance of the firm, and whether the ISO standards are being adhered to.[1]
- ***What factors lead to success?*** The small sample size available makes most of the conclusions relating firm and system characteristics to firm performance quite speculative. A larger sample might yield more reliable results.
- ***What implementation models are most effective?*** The current sample is dominated by two very high-performing projects—Uruguay and Colombia which took similar approaches, focusing strongly on implementation. A larger sample of respondents could enable cross-project comparisons in firm performance, leading to important lessons for future implementation projects.
- ***What happens over time?*** Quality management systems may decay over time, or as the results of this analysis suggest, they may improve over time. Is there a point in time at which systems become routine and bureaucratic and need to be renewed? What can be done to renew and revitalize quality systems?

[1] In some cases firms that appeared to be certified indicated that they did not have in place elements that are required by the ISO standard

III. METHODOLOGY

III. A Management Systems Performance Indicators

To facilitate the monitoring of the ISO cluster and to measure productivity gains from implementing ISO systems, the MIF Office commissioned, in partnership with the World Bank, a study of **Management Systems Performance Indicators** in June 2000. These indicators, in the form of a survey instrument, were designed to enable organizations sponsoring the establishment of quality and/or environmental management systems in SMEs to track the effectiveness of these ISO systems in meeting economic and environmental objectives. The indicators were designed to provide a single consistently applied tool to gauge the success of individual MIF-sponsored ISO management system projects.

In addition to the above, the availability of the data gathered using the quality management system (QMS)/environmental management system (EMS) indicators creates a unique opportunity for MIF to perform cross-project analyses of QMS/EMS implementation. If the indicators are used consistently across MIF projects, and the data is consistently captured and maintained, MIF will have the largest database available on SME QMS/EMS implementation and performance (ultimately covering hundreds of SMEs). This database will be large enough to permit statistical testing of various hypotheses concerning QMS/EMSs including whether management systems implementation results in improved environmental/quality performance, improved business profitability, and whether certain aspects of QMSs/EMSs are essential for improved performance.

Unfortunately, the results of the 2003 analysis concerning the ability and willingness of firms to collect and report data were not encouraging. Although most firms gathered and reported baseline data, few firms gathered and reported post system implementation data, and those that did so for the most part provided data that was of low quality.

To obtain improved information, particularly trend data, The Lexington Group revised the questionnaire for 2004. The following were the major modifications:

- Section 1 (General Information): minor modifications
- Section 2 (Management System Description): streamlining of questions, elimination of open-ended responses,
- Section 3 (System implementation): streamlining of questions, addition of an overall satisfaction question, elimination of open-ended questions.
- Section 4 (System Performance): revised approach based on firms perceptions of changes in their performance rather than reported quantitative performance data.

The changes in the questionnaire resulted in substantially more section 4 (performance) data, but did not increase the total number of responses. In fact, fewer firms responded in 2004 than responded in 2004. The relatively low 2004 response rate may be due to the shorter amount of time available for firms to submit 2004 data as well as to greater

selectivity in the firms that submitted. In 2003 the most respondent firms were beginning implementation, while in 2004 most respondent firms were well into implementation.

III. B. The MIF Management Performance Indicator database

The survey instrument for both EMS and QMS projects covers four major areas:

1. **Part I:** Firm description. This section contains general data about the firm such as location, size, sector, and ownership structure, markets and customer interest in management systems. Firms complete this section on entering a MIF-sponsored project.
2. **Part II:** Management systems description. This section focuses on the overall design of the firm's management system, the assignment of roles and responsibilities within the firm (senior management involvement, cross functional participation, employee involvement, management processes and priorities in quality or environmental management). Firms complete this section on initially entering the project and once they have completed the design of their management system. The data currently in the database reflects the baseline management systems in place as firms began implementation.
3. **Part III:** Experience implementing the program. This section asks the respondents to describe their experiences implementing a QMS or an EMS. It begins by asking what motivated the firm to put a system in place and then asks about the major supports, barriers, costs and benefits that the firm encountered in the process of implementing a management system. Because this section asks specifically about a firm's experience in the management systems implementation process, only firms that are well along in implementation can respond to it. For this reason, it is completed after the implementation of the management system.
4. **Part IV:** (Firm Performance) as noted above, this section contains data based on firm perceptions of changes in their performance as a result of having implemented the management system.

With a few exceptions, the QMS and EMS data-gathering tools are similar.

The data from the questionnaires described above are gathered and subsequently input into the MIF Management Performance Indicators (MPI) database. It is expected that as implementation proceeds, the database will become increasingly robust.

The web version of the database allows users to access either individual firm data elements or to generate pre-formatted reports. Data is available through the web for three categories of users in the web database:

- Executing agencies are able to access data for firms that are participating or have participated in their projects. These data are available on an aggregate basis for all firms that participated in a given project; by firm; or broken out by the degree of market influence on the firm in pre-formatted reports (see the description of available reports below). Individual executing agencies cannot access firm- or project-specific

data for either firms or projects that they are not directly associated with. For benchmarking purposes, however, they can access public data for all quality or environmental projects (using this capability, they will be able to compare firms within their purview to other firms that have participated in MIF-sponsored projects).

- The public can access aggregate data, including distribution of responses, for all firms and all projects broken out by type of project (environment or quality) and/or degree of market influence. The public cannot access individual firm or project data.
- The IDB/MIF can access data for all projects and/or firms that have participated in the program either in aggregate or broken out by firm or project, by type of project (quality or environment) or by degree of market influence.

Preformatted reports are available providing based on the analyses contained in this report. These indicators cover key firm and management system characteristics as well as key aspects of the experience of the firms in implementing the system. Data can be broken out by:

- ***Customer interest***—the degree to which firm's customers have required or expressed interest in their management system:
  - Firms that are subject to relatively little market pressure. Fewer than 50% of these firms' customers are customers where the firm believes the system can provide an advantage,
  - Firms that are subject to moderate market pressure. They state that the system can or does give them an advantage with their customers, but fewer than 50% of their customers have asked about or require a management system,
  - Firms that are subject to strong market pressure. These firms state that that the system can give them an advantage with more than 50% of their customers *and* more than 50% of their customers have asked about or require a management system.
- ***Time since implementation***—the time since the firm began implementation of the system:
  - Less than six months
  - Six months to two years
  - More than two years.[2]
- ***System performance***—changes in performance due to implementation of the system as perceived by the respondent companies.
  - Low—few significant changes in performance
  - Moderate—moderate improvements in performance but no "high" or "very high" changes,
  - High—One or more "high" changes in performance but no "very high" changes,
  - Very high—at least one "very high" improvement in performance.

[2]At the meeting where the results of this analysis were presented the suggestion was made that the database could be segmented by key management systems milestones—begin implementation, initial audit, certification audit. This approach corresponds fairly closely to the time of implementation approach.

IV. RESULTS OF THE ANALYSIS

This section summarizes the results of The Lexington Group's analysis of the data contained in MIF**'s** MPI database. *It is important to note that new projects and firms are continually entering the MIF ISO cluster. For this reason this analysis is essentially a snapshot of firms that were in the database in May 2004.* Nevertheless, the characteristics of the firms appear to be quite consistent. It is probable, therefore that as additional firms are added to the database their characteristics will be similar to those of the firms already in the database.

It is important to recognize at the outset that the analysis presented below is based on a limited sample of 134 firms that had responded to two key questions: 3.8, "Based on your experience, would you recommend to others that they participate in a similar project?" and 4.1 "Please indicate if your firm has achieve changes in performance in the following areas?" (11 areas of performance are listed). As shown in Figure 1, the focus of the projects appears to have been much more strongly on outreach (over 40,000 firms were contacted in some form) than on program implementation (only 1.2% of the firms contacted implemented a system). While there is an important value in increasing awareness of ISO standards, the disparity between the number of firms contacted and the number of firms actually implementing systems may be a cause for concern, particularly about the allocation of effort between outreach and implementation in the projects. In addition, the response rate to the survey was quite low, despite repeated urging by the Bank and consultants. Only 27.5% of the firms that the projects claimed were in the process of implementing systems responded to the questionnaire.[3]

On the other hand, it is also apparent from figure 1 that where implementation did take place, it was quite successful. Over 65% of the firms said they had achieved greatly improved performance and nearly 92% were very satisfied with their participation in the project. A preliminary conclusion would be that while the projects have developed a good implementation model, that model has not been implemented as widely as it can be. Compared to the need, despite a quite significant investment, the ISO cluster projects have only begun to scratch the surface. This statement is not as much a criticism of the implementation of the projects as it simply recognizes a need that exists.

[3] It is relevant to note that there was considerable variability among projects in responses (but not as much in implementation results). This reflects a difference in approaches. Columbia and Uruguay had very high levels of implementation while Argentina and Chile focused more heavily on outreach.

Figure 1: Summary results

Parameter	Number of Firms	Percent of Firms
Firms contacted	40,215	100%
Sistem implemented	487	1.2
Responded to questions 3.8 & 4.1	134	27.5
With > 6 months in implementation	115	85.8
With high or very high performance	75	65.2
With high or very high satisfaction	123	91.8

The results of the analysis are presented below in five sections:

A. Management system structure:
B. Costs and benefits of implementing a system,
C. Changes in performance due to system implementation,
D. Customer (firm) satisfaction with their participation in the MIF cluster project
E. Factors that lead to success

The remainder of this report describes the results of this analysis.

IV.A. Management System Structure

Overall, the management structures are appropriate for small company quality management systems. Key systems elements such as senior management involvement, appropriate delegation of responsibility, appropriate staff involvement and the use of systems audits appear to be in place. On the other hand, the implementation of operational management elements such as use of implementation committees, staff training and compensation, and use of performance indicators is lacking. This dichotomy may reflect the fact that the leadership of the ISO cluster projects comes from quality management organizations rather than operationally-focused organizations.

Key systems characteristics include:

- ***A high level of senior management participation:*** in over three quarters of the firms the senior manager participates actively or very actively in the implementation of the system,
- ***Appropriate designation of a senior management representative.*** Generally, the senior management representative should be a tier two staff member (one who responds directly to the senior manager). In most cases when the senior manager

personally takes on the role of senior management representative, the role tends to be ignored given his or her other responsibility. Designation of a more junior manager tends to give insufficient authority to the role. Among the firms reporting to the MIF survey, two thirds have a tier two official as senior management representative and less than 10% have a tier three or lower employee in the role.

- ***Moderate use of implementation committees.*** Likewise 56% of firms appropriately used cross-disciplinary implementation committees. The fact that 44% did *not* use cross disciplinary implementation committees is, however, a cause for concern.
- ***Appropriate distribution of responsibility for quality.*** Responsibility for quality was allocated as follows:
    - Senior manager: 67%
    - Quality manager: 60%
    - Line workers: 38%
    - Supervisors: 34%
    - Other: 36%

  Ideally, an even greater recognition that "quality is everyone's responsibility" would have been preferable. Nevertheless, the fact that the above percents add up to 235% indicates that there is a good recognition that responsibility for quality cannot be confined to one individual (on average each firm indicated that 2.35 individuals or groups are responsible for quality.
- ***Limited use of compensation mechanisms to promote quality.*** Only 34% of the firms reward quality performance through compensation mechanisms. This suggests a possible opportunity to improve quality among firms that do not use compensation systems to motivate quality improvements
- ***Existence of quality training procedures, but relatively low level of implementation.*** Fully 80% of the firms said they had a procedure in place to guarantee training in quality to all employees, but only 26% said they had implemented awareness training programs, and only 23% said they had implemented competency training programs. (7 % said they had "other" types of programs). Since most firms that have one form of training also have the others, a very large fraction of firms did not say they had any kind of training. Again, this is an important area of opportunity for improvement.
- ***Moderate use of quality performance indicators.*** The following were the major quality performance indicators used:
    - Customer complaints: 30%
    - Customer satisfaction: 28%
    - Supplier performance: 22%
    - Waste generation and product reprocessing rates: 14%
    - Lost time and machinery inactive time (uptime): 8%

  The facts that the above percentages sum to only 102% and that most firms who reported using one indicator also reported using other indicators (multiple responses were permitted) suggest that many firms do not use performance indicators. Again this is an important area for improvement.

- ***Appropriate use of audits:*** About two thirds of the firms said they conducted systems audits yearly or more frequently, two percent said their most recent audit was more than a year earlier and 29% said they had not conducted audits. Since only 85% of the firms had been in implementation more than six months, it is not surprising that some firms have not conducted audits. In addition 52% of the firms said that they had addressed all or more than one half of the findings of the most recent audit. The relatively high proportion of firms using audits compared to those using performance indicators suggests a bias towards systems audits in quality management. Both audits and performance measurement using indicators are important.
- ***Appropriate senior management involvement in management reviews.*** Two thirds of the firms said they had had a senior management review within the past six months. Given that only 85% have had a system in place more than 6 months this is a quite high percentage. It suggests that senior management is taking quality management seriously.

IV.B Costs and Benefits of Implementing a System

The respondent firms appear to have met their objectives in joining the program and to have obtained tangible as well as intangible benefits from their participation in the cluster projects. Management support was the key factor aiding implementation and firm cultural factors were the key obstacles.

- ***Improving quality performance was the most important reason firms participated in the projects.*** Eighty-four percent considered improving quality performance an "important" or "critical" reason to participate in the projects. Sixty-three percent and 43% respectively of respondents pointed to a desire to obtain certification to improve their position in national or international markets. (This result may be biased by the strong representation in the sample of Uruguayan firms who were responding to a requirement to have certification in order to do business with the government). Fifty-one percent were looking to meet a client requirement and 10% had a specific invitation from the client to participate in the program. Finally, 9% were responding to the requirements of financial stakeholders (banks or shareholders). These responses sum up to 260%, indicating an average of 2.6 responses per firm. Since firms were asked to give no more than 3 "important" or "critical" reasons to participate, the results suggest that relatively few firms gave less than three "important" or "critical" reasons to participate.
- ***The benefits firms obtained from participating in the projects related primarily to image, product quality and client and employee relations.*** The following percentages of firms pointed to "important" or "critical" benefits of participating in the projects, as compared to their "important" or "critical" benefits of participating:
    - 66% improved corporate image
    - 64% improved product quality
    - 40% improved client relationships
    - 40% improved staff and employee satisfaction

    - 22% reduced operating cost and
    - 10% gained improved access to sources of financing.

  As in the case of reasons for participating, the responses sum up to 242% indicating that most firms gave multiple responses.
- ***Human rather than equipment costs dominated the costs of participating in the projects.*** The most frequently-cited "important" or "critical" costs of participating were:
    - Consulting cost—65%
    - Staff time—60%
    - Training—43%
    - Equipment costs—27%
    - Opportunity costs (other areas that were not worked on)—10%

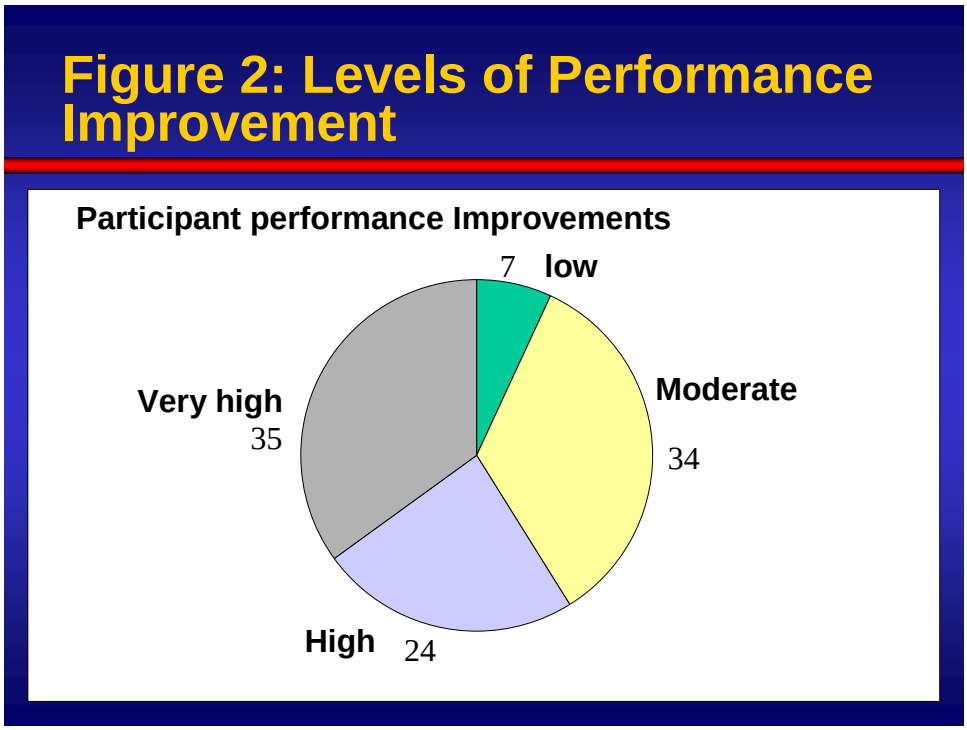
  The responses sum to 205%, suggesting that costs were not considered as important benefits and reasons for participating.
- ***Management support was most frequently cited as the main support for implementation.*** "Important" or "critical" supports were:
    - Senior management support—81%
    - Middle management support—51%
    - Training—44%
    - Staff support—43%
- ***Staff time and firm cultural factors were the major obstacles to implementing programs.*** "Important" or "critical" obstacles included:
    - Staff time—67%
    - Lack of a systems and quality culture within the firm—42%
    - Lack of consciousness and awareness on the part of employees—30%
    - Inadequate training—19%
    - Complexity of the (ISO 9001) standard—17%

IV.C Changes in performance due to system implementation

As noted above, the methodology used to gauge changes in performance was modified from one based on actual reported performance to one based on the respondent's perceptions of changes in the firm's. In the original design of the data gathering instrument, firms would report their baseline and subsequent period performance for certain key parameters and the project analysts would compare period to period performance. This approach proved impracticable due in large measure to the fact that the firms "voted with their feet" by not providing the requested information (and the projects either could not or would not pressure the firms in their project to provide the requested information). The revised approach is definitely a second best solution.

Nevertheless, despite the limitations of the approach, the study results indicate that the firms participating in the project had substantially improved their performance in "process" areas (improved employee participation), physical outcomes (reduced cost of reworking defective products and reduced sales lost and warranty costs due to poor quality products) and in customer relations. Nearly 60% of the firms had attained "very

high" or "high" performance improvements; about one third had attained moderate levels of improvement and less than 10% had low levels of improvement (Figure 2).[4]



More specifically, the respondent firms attained the following improvements in their quality performance due to their participation in the projects:

- ***Employee participation, the single category of performance improvement reported most frequentl,y was a "process" rather than "outcome" category of improvement.*** Seventy two percent of the firms reported that they had witnessed a very high or high increase in the level of employee participation in the firm's quality program as a result of participating in the projects. This response is important because it indicates that firms are involving their employees in their quality management systems. This is one of the key elements for a successful program and it is encouraging to see that firms are reporting improvements in this area.
- ***As a group, the most frequently cited measures of performance improvement had to do with customers relations:***
    - 64% reported closer relations with their customers as a result of participating in the projects,
    - 59% reported that they were better able to respond to customer requirements,
    - 37% reported that increased sales due to better quality,

[4] Performance improvements levels were defined based on the number of areas where firms reported "very high," "high," "some," "little," and "no" performance improvement in 11 areas of performance. Category definitions

    - 24% reported an ability to protect existing market by having a quality management system.
- ***Physical outcome measures were less frequently-cited, but they were important nevertheless.***
    - 37% reported reduced quality problems, resulting in fewer lost sales,
    - 29% reported reduced rework costs,
    - 24% reported reduced warranty costs.

IV. D. Customer (firm) satisfaction with their participation in the MIF cluster project

Just as it is important for firms to track customer satisfaction with their quality performance, it is important for ISO cluster projects to track the satisfaction of their "customers," the firms participating in the projects. By this measure, perhaps the most important single measure, the projects have been quite successful. When asked whether they would recommend participation in a similar project to another firm, 93% of the firm respondents responded that they would "absolutely" or "very possibly" recommend participation in a similar project. Only 7% said they would recommend participation "with reservations" and no firms said they would not recommend participation.[5]

The reasons given by firms for recommending participation to others in ISO cluster projects are consistent with the benefits of participation that they cited:

- We attained important quality improvements as a result of participating in the project (67%),
- The project was valuable in our relationship with our clients (60%),
- We received good support in the project (59%),
- It was important in motivating our employees (50%).

By contrast, only one or two percent of the firms cited specific reasons for not recommending participation in the projects. Reasons cited by two percent of respondents included: lack of cost reductions, excessive cost of participating, excessive staff time required, and the system is two complex and bureaucratic. Reasons cited by one percent of respondents included: no benefit with clients, absence of quality improvements, and lack of the expected support.

Overall, the reservoir of good will that resulted from the initial ISO cluster projects establishes the conditions to address the major deficiency of the cluster—the fact that to date fewer than 500 firms are implementing quality management systems. The model used in the key respondent countries, notably Uruguay and Colombia, clearly works and has resulted in a very high degree of satisfaction among the firms that have participated. The positive response to this model and the willingness of firms that have participated to

[5] It is important to recognize that surveys of this nature inherently have an upward bias. Two factors need to be taken into account: the survey did not contain any other questions that could be used to verify responses (for example, "Have you recommended participation to another firm?"), and the survey responses were turned into the projects and then sent on to the ISO cluster database. The responding firms may have felt a need to be polite to the project that had sponsored their participation. Nevertheless, the very strong positive response to this question suggests a high degree of customer satisfaction.

speak on its behalf suggests that these firms can be used to market the concept within their industries and sectors.

IV.E Factors that lead to success

Lastly, a study of this nature should suggest factors that lead to success in implementing quality management systems. Here our results are somewhat qualified. We did not identify any specific systems characteristics that were consistently and strongly correlated with high performance. In general (and somewhat to our surprise), firms with medium to very high performance did not differ significantly in the degree to which they put specific systems elements into practice. This may be due to a too-small sample size or (more likely) to insufficient differentiation among moderate, high and very high performing firms in the study given the modified approach to measuring performance.

On the other hand, the study did identify factors that lead to *low* levels of performance.

- ***Limited use of awareness training and competency training.*** None of the low performance firms used either,
- ***Limited communication of quality priorities.*** Again, none of the low performing firms had a system in place to communicate quality priorities internally,
- ***Limited use of audits.*** Sixty seven percent of the low performing firms had not had an audit within the past year or had never had an audit as compared to 15% of all the companies.[6]

Somewhat more speculatively, we attempted to determine other factors that might condition high and low performance. Though we again found relatively little difference among medium to very high performing firms, we found substantial differences between these firms and low performing firms. As shown in Figure 3, low performing firms tended to:

- ***Be less subject to market pressure to put a quality management system in place.*** Only 22% of low performing firms were subject to "high" market pressure (more than 50% of customers have requested a quality management system) as compared to 34% and 41% respectively for medium/high and very high performing firms.
- ***Have less than two years since the start up of implementation.*** Only 11% of the low performing firms had had systems in place for over two years as compared to 19% and 30% respectively for medium/high and very high performing firms,

In turn these results led to significantly lower satisfaction on the part of low performing firms with their participation in the project: Only 14 % of the low performing firms were very satisfied with their participation in the projects as compared to 43% and 57% respectively of the medium/high and very high performing firms. As noted above, however, these results can only be considered suggestive since they are based on very small sample sizes.

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[6]Limited time of implementation does not explain the differences between high and low performing firms. All the low-performing firms had had their systems in place for more than six months and over half had had them in place for more than a year.

Figure 3: What leads to succes? A more speculative analysis

Relationship between performance and characteristis*

Performance / Characteristic	Low	Medium-High	Very High
High level of market pressure	22%	34%	41%
> 2 years in implementation	11%	19%	30%
High satisfaction	14%	43%	57%

*% of firms in the category with a given characteristic