Benefits of Implementing a Paperless Web-based Quality Management System – A Practical Case Study

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Introduction
Over the past few decades, the technology has taken an astonishing leap forward. Every area of human life has felt its impact in one-way or the other. The primary focus by most organizations in using the new technology had been on speed with which more could be achieved in less time and cost.

Since Quality Assurance, Control and Management field belongs to the collection of tasks and activities aimed to produce a product or service that must fulfil the requirements, the use of technology therefore must focus chiefly on improving the way work is carried out in the organizations.

This is a practical case study of one organization that used the web-technology to their best advantage in their quest for quality. It describes how this company designed, developed, and implemented a paperless ISO-9001: 2000 oriented web-based Quality Management System on their intranet. It explains the difficulties encountered and how were these resolved. The paper also highlights the encouraging results achieved in terms of improvements in people, processes and business.

The Company – NTSA
Norconsult Telematics Saudi Arabia (NTSA) is an international organization providing Consultancy Services in Telecommunication and Information Technology in many countries of the world.

The Need of the NTSA
Like many other progressive organisations worldwide, the concept Process Approach to Business was very much in the thoughts and actions of NTSA Management well ahead of the publication of ISO9001: 2000. The company had even drafted the changes for their way of working based on process approach and thinking entire business as one knitted and interlinked system. There was a need for a framework at International standing to implement this approach globally.

ISO9001: 2000 provided all the ingredients for NTSA culture and needs. A sister company of NTSA, Teleplan, had already been working on these lines for some times. Help and assistance was available in terms of technical expertise and also adoption of core structure of their QMS.

NTSA Approach
In order to inculcate ISO 9000:2000 philosophy NTSA adapted the following approach. We said, we would first Specify the end results and Plan the work. We then Develop the
work processes before we **Implement** the system. We would **Monitor & Measure** the results as work progresses and **Improve** it. Sounds simple. It was not.

**How Did Norconsult Telematics Go About It?**

We specify the end results

Based on above approach, the company set the long-term objectives to make and sustain the business improvements, achieve increased customer satisfaction, inculcate good housekeeping and provide the opportunity for staff to participate and contribute in processes. All of these are essentially the elements of business improvement. This was specifying the end results.

We Plan the tasks

During the Planning, the top management of the company took strategic decision and defined the objectives, methodology and overall framework for our Quality Management System. It recognised that the best ways to achieve the goals in first to harmonise our words and actions and secondly to communicate them to the entire organisation through a well-designed Quality Management System (QMS) available to everyone on the company’s intranet facility, and finally to guide and monitor the progress.

The core objectives behind this strategy were:

1. Employees, client and contractor to have a uniform and same understanding of what and how the company operates.
2. Staff to have a professional approach to their work.
3. All company related documents (Policies, procedures, processes, forms guidelines etc) to be available, readily, timely and in current version.
4. Guidelines, clarification, explanations are available on web thus saving time to find information related to company system.
5. An On-line facility for users to suggest improvements made is available.
6. Timely on-line availability of changes in QMS system.
7. Collation and managing the Knowledge gained through continuous learning processes by the staff and using it as a feedback for system improvements.

With these core objectives the company adopted the following methodology for design, implementation, and use of the Company web-based QMS oriented around ISO 9001:2000.

- Understanding the needs of Customers, Employees and Company
- Understanding the requirements of the ISO9001: 2000 standard
- Determining QMS scope, permissible exclusions and Process Owners.
- Preparing Value Chain, Core & Support Processes and Templates.
- Establishing measurable Quality Objectives
- Top management review of the entire system
- Information and training of all employee within organization
- Active and Regular use of Quality Management System.
- Conducting Internal Audits
- Selection of certification organization and conducting audit
- Continuous improvement of QMS, Data collection and analysis.
The framework of our QMS consisted of a Company Value Chain (Level I), Associated and inter-linked processes (Level II) and required work instructions, templates, guidelines, forms etc. (Level III). All knitted into a well-presented and user-friendly web.

NTSA Develops QA System
A QA system was then developed as a collection of processes, documents, procedures and templates that describe workflow and quality requirements. Norconsult distributes QA systems to relevant staff using web technology. The Norconsult web based QA system is a complete and the only source of QA documents. A separate QA system is developed for each Client or project in order to match the contract and project requirements.

Norconsult has it’s own internal QA system certified to the ISO 9001:2000 standard. This standard requires that workflow is described as processes, i.e., activities with defined input, output and interfaces to other activities and processes. We combine related processes into core functions or value chain elements. The collection of value chain elements makes up the company’s core business activities or the company value chain. The Norconsult value chain is described in figure 1 and a sample work process is outlined in figure 2. For a user of the system, the first page of NTSA quality Management System Web opens in an attractive window shown in figure 3.
The system thus designed and implemented was a simple, easy to access and use website of Norconsult Telematics’ Quality Management System. It was made available to all users via intranet across the country. Awareness and training sessions were conducted for all users and they were given ample time to practice and become familiar with the system before the official launch. A date was then set to officially initiate the use of the system. From this date onwards the system becomes auditable as described in ‘NTSA QA
SYSTEM Web’ and all activities and tasks were to be conducted as in system using templates, process, guidelines etc. The system was well tried and tested before the launch.

We conduct Monitoring and Measuring activity
The activities were immediately commenced after the launch. First the “Audits of Understanding- (AOU)” [a term first time coined and used by QA department of NTSA] were conducted. The objectives of the AOU's were to ensure that all users understand the processes, their interaction, flow, contents, the use of our Web and the way results and output of processes was to be recorded. Some formal audits were also conducted during this period.

We Improve the System.
One of our processes within the system describes how we shall improve our QA System. It allows the users to make suggestions for improvement via web. User can click and open an e-mail and enter his suggestion there. This is then dealt with as described in the Improvement Process.

Over the last 3 years since the implementation of the system, it has received over 200 suggestions for improvements. These were higher in number in the beginning and then as the system matured the number reduced as expected. Also the time to process the suggestion and implement into the system reduced.

What did NTSA gain
The use of Web-technology paid off. The outcome resulted in several areas: (1) Continuous accreditation of our QMS System over three years without any non-conformity. (2) Built-in business confidence. (3) Better customer focus. (4) Staff motivation. (5) Reduced use of paper. (6) A comprehensive understanding and awareness of Business Quality and excellence by all staff, and (7) Improved in-house management.

In addition, reduction in use of paper, (Since QMS is web-based paperless system), easy storage of completed documents, fast retrieval, and most of all motivational factor of participation by staff were bonus to be achieved by the company.

On 14 December 2001 (exactly one year after the launch of ISO 9000:2000 version of the Quality Standard by ISO), the NTSA was successfully assessed and found to be in compliance with this standard and a Certificate of Approval was issued. Norconsult Telematics is one of the first few companies in the Kingdom of Saudi Arabia to have achieved the certification on revised standard ISO9000: 2000 in Telecommunication and IT Sector.

Lessons Learnt
Here is a brief description of events, lessons learnt, successes, failures, observations, delights, surprises, tears and incidents that came to pass during various phases of our Quest for Quality. It was not an easy sailing.

Work Hard against Hard Work
The company decided not to re-invent the wheel but to use the existing technology, experience and skills. This simply means we were not ready to commit ourselves to near
impossible tasks due to limited resources. We decided to work hard on what we had then to do the hard work of inventing new ways of doing things. We took advantage of what our sister company Teleplan was doing in Europe. We went for web-based QA system using tools such excel and word. The wisdom behind this was to be pragmatic and achieve early tangible gains.

Did we go wrong en-route Indeed we did. Along the way we tried to change the proven format by the Teleplan to cater for our ‘good to have’ or ‘nice to change’ wishes and stumbled a few times. The lesson we learnt was to use the tool as instructed and when the job is done successfully then review it to improve it later. There are many unknown parameters in each approach, changing one triggers change in many variables and that may upset the entire process. Stick to what you have and can do best with. Get the job done then improve it.

Discuss & Develop against Develop & Discuss
Another good lesson we took from the very start was to thoroughly discuss the requirements of what was needed, go through every aspects of it and then design / develop. This needed brought less fixes later saving cost and time.

We missed on one or two roundabouts here too but soon did the U-turn and amended. We noticed that wherever a short cut was taken to develop a part of the system before a democratic discussion, the completion took longer, three to four times longer in some cases.

Cry then Laugh against Laugh then Cry
We did not rush things though we went with full speed. We did not through parties at each process completion. We argued, even quarrelled (but fist fighting), we sweated understanding the right and wrong, we delayed, went home late, sad, long faced but we remained steadfast and glued to objectives of achieving the best. This paid off. We cannot forget arguing bitterly (but faithfully) on defining our “product”, our “Purchases” as we are a service oriented consulting organisation. We got there eventually, satisfied with full understanding of our “Product” etc. Lessons we learnt was to thrash out all the differences in-house whilst developing the system such that when we face the outside world (client, contractor, employees, authorities, auditors etc) we have no ambiguity or mismatch of words, thoughts, actions or understanding.

Again we sat down and decided that merely disagreeing to any proposed entity is pointless unless an alternative is proposed with full justification and pros and cons of proposed and suggested alternative. This single entity gave us huge benefits later on in suggesting improvements to system. We would not except any change to our QA system merely for the sake of change alone. The proposer must provide pros and cons and full justification for change and proposed alternative. About 30 Major changes were made to our system over the last four years bring the system to full maturity and success.

Among other things we learnt that planning the sequence of events and monitoring always helps. Devotion of time and efforts brings fruit and it is essential to have a good commitment and understanding of the top management along with built-in patience to accomplish a proper QA system that value adds to your organisation and drives the activities within. It should not be burden that an organisation carries on its shoulders.
Where are we now?
Our well thought and implemented QMS is working successfully for the last four years. During this period we have gone through a Certification and a Re-certification audit plus 5 Surveillance audits without any nonconformity. But we believe our major success is in the following three areas:

A. Customer Focus:

Contract Analysis. Prior to implementation of company’s QMS system, the activity of analysing new contracts had different forms and took appreciable time to finalize. Since the implementation of the system, not only Contract Analysis has shaped into an important process with well-defined boundaries, it has produced uniform and clear documents and has taken at least 30% less time to complete. In addition the Production of Project Execution Plans is also conducted as an essential part of the process in more uniform manner than before. This in consequences provided the project management leverage for better implementation of tasks, which are now better defined and know to all concerned. This in itself inculcated higher quality and performance on projects.

Customer Complaints. As a result of Quality and business excellence awareness and uniformity of tasks, the number of customer complaints has been reduced as indicated in Table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Reduction in Complaint from previous year</th>
<th>Reduction in Processing time from previous year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>2002</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>2003</td>
<td>72%</td>
<td>30%</td>
</tr>
<tr>
<td>2004</td>
<td>70%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Table I: Reduction in Customer Complaints and their Processing Time

B. Audits Results

Internal: NTSA conducts large number of internal audits on company core process, support process and project processes. Overall number of non-conformities per audit had been reducing since the start of process as shown in Table II.

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC/Audit</td>
<td>0.33</td>
<td>0.25</td>
<td>0.07</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Table II: Reduction in non-conformities per internal audit

External: Accreditation body BVQI has conducted one Initial Audit, including Assessment of fully web-based Documentation and 5 Surveillance audits since 2001. During these audits not only the company was declared successful and had no audit non-
conformity, the auditors commended on the design, implementation and maintenance of the system and wished other organizations had taken similar initiatives for their business improvement. This is a major credit to the company’s endeavour in the quest for Quality. Again in a Re-Certification audit held in December 2004 the Company was successful with flying colours.

**NTSA Quality Management System - A Beacon of light for others**

Norconsult also develops QA system for clients or project as an integrated part of project quality services, or as a separate project in itself. The system development is done in several phases using several steps from the methodology described previously. We define the value chain, specify the system, prepare the processes and implement the system. Processes are either a part of the company value chain (called *operational processes*) or they support the operations (*support processes*).

Operational processes describe tasks, authorities, responsibilities, interfaces, input and output. A *Process Owner* is appointed for each process. The Process Owner is a person responsible for defining, implementing and maintaining a process. The entire process is completed for the client in eight phases.

Phase 1: Review existing Client processes.
Phase 2: Prepare draft website with value chain processes (Level 1).
Phase 3: Define operational Processes (Level 2).
Phase 4: Define support Processes (Level 2).
Phase 5: Prepare Level 3 Documents (like templates etc).
Phase 6: Conduct user training.
Phase 7: Implement QA system

**Conclusions**

It is evident that substantial business improvements can be made and sustained through the effective use of web-based Quality Management System. It is one of the best tools for Knowledge Management and learning experience of the staff and using it as a feedback into the system to improve the business. This has been achieved by Norconsult Telematics of Saudi Arabia successfully.

Quality is no longer an abstract concept. It has grown from an artistic notion to an exact science. It has evolved from basic quest of mankind for becoming better. In the past Quality was considered to be part of technical requirements. World has moved beyond the limited definition of quality as technical system of hardware and software to a much wider concept of socio-technical system where man, machine, method, money, management, manners, and many other factors have been integrated into our quest for quality and excellence.

In order to achieve business excellence and improved profitability the organizations need to use the well proven and user-friendly documented system equipped with current technology. It is essential that all aspects of technical and social impacts be considered under the guidance of those who have successfully treaded the path and are qualified to assist others.

………………………………… End.