PERSONALIZIRANI WEB QMS KONTROLNI PRIKAZI KOJI KORISTE BESPLATNO RASPOLOŽIVE JAVASCRIPT DODATKE

PERSONALIZED WEB QMS DASHBOARDS USING FREE AVAILABLE JS PLUGINS

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REZIME
Današnje dinamično i zahtjevno poslovno tržište nameće sve veću potrebu implementiranja softverskih rješenja za upravljanje kvalitetom u bilo kojoj organizaciji, kako bi se na efikasan i efektivan način upravljalo uspostavljenim procesima unutar organizacije, minimizirao uticaj prijetnji i rizika iz okruženja kao i ubrzao process donošenja odluka na osnovu analize ključnih poslovnih pokazatelja relevantnih za organizacijsko poslovanje.
U ovom radu će biti razmatreno nekoliko ključnih pitanja u procesu odabira, kreiranja i implementacije QMS softverskog rješenja u formi Web personaliziranih kontrolnih panela (dashboards) sa referencama na korištenje i različita svojstva JavaScripts plugin-a kao tehnologije u adaptivnom funkcionisanju ovakvih sistema.

Ključne riječi: QM, QMS, eQMS, QMSS, GRC, JS, plugin

ABSTRACT
Today's dynamic and demanding business market imposes an increasing need for implementation of a software solutions for quality management in any organization in order to manage the established processes within the organization efficiently and effectively, minimize the impact of threats and risks from the environment and accelerate the decision-making processes based on the analysis of key business indicators relevant to the organization operations.
In this paper, several key issues will be considered in the process of selecting, creating and implementing QMS software solutions in the form of Web personalized control panels (dashboards) with references to usage and different properties of JavaScripts plugins as the technologies in the adaptive functioning of such systems.

Keywords: QM, QMS, eQMS, QMSS, GRC, JS, plugin

1. INTRODUCTION

Identifying risks, managing opportunities as well as overcoming weaknesses and inefficiencies within the organization becomes an imperative in today's business environment in which digital data and information are dominant in terms of effective and efficient management and improvement of the organization. The problem of disproportionate and irrational time-consuming in data collection for reporting and analysing the performance of business processes within the company, has been recognized by many GRC experts including QMS experts as

well. An annual survey of 200+ professionals in the UK showed that more than 40% of the average working day was spent collecting data from various departments of their companies. [4]
The development of technological solutions for different processes within the company, leads to an increasing problem of management and monitoring of certain activities and indicators within the implemented quality management system. Companies that are aware and appreciate their resources, time and money mitigate these problems by facilitating a more efficient option - an automated quality management system (eQMS). A personalized and automated approach greatly simplifies the whole process of quality management, which freeing up more time and resources that can be focused and directed on other critical business issues. Relying on manual QM system can have many implications on the implemented QM system in the organization. In many cases, manual QM system relies on excel and word documents through email systems where workers can hardly maintain the system up to date or have a better "picture" of the comprehensive QM system in place and its performances. Appropriate QMS software, on the other hand, is responsive and reliable enough to efficiently serve an organization. It is not only convenient but should be user-friendly and intuitive. This encourages employees to work with it, enhancing the employee perception of quality management in the organization. Therefore, it could be said that a formalized software system which manages processes, procedures, responsibilities, and performances with the goal of achieving quality policies and objectives within an organization can be described as a Quality Management System Software (QMSS). [1]

2. BASIC CONSIDERATIONS FOR THE INTRODUCTION OF QMS SOFTWARE

There are a number of things to consider when choosing or creating the proper type of QMSS with the capabilities necessary to handle the quality management system. In general, more and more software vendors are providing different solutions for Quality and QM than ever before. In the circumstances of high demand and a large vendor landscape, it sometimes becomes difficult to decide which systems provide the greatest value and guarantee a successful implementation. A significant amount of time and effort in choosing QMSS solution by the company is also reflected in the employment of consultants, the selection teams, long time demonstrations and negotiations.
On the other side, the question arises as to if the organization should and is capable to create appropriate QMSS solution with its resources in a reasonable and acceptable time with adequate characteristics and properties for its established or planned QMS system.
Very important consideration in choosing or creating QMSS solution is the technical ability and experience of those responsible for managing the quality management system. Large companies with a Quality Manager with a quality management team can handle a more complicated system than a small company with an employee who manages the quality system in addition to his other responsibilities. The existing computer system, server capacity and other technical capabilities in place are other considerations when introducing QMSS solution in the organisation. [2]
As mentioned before, when introducing QMSS solution in the organisation, special attention should be paid to the following questions:

- Adaptability to Business Processes - adaptability to existing business processes. QMSS solution should not be around a generic, best-practices approach that cannot be changed according to long time developed and fine-tuned business processes without substantial time and cost.
- QMSS as Web-Based solution
- QMSS as a Brand - the ability to control all aspects of the user interface. It helps a better user acceptance of QMSS.

- Sense of the Data: Reporting, Searching and Analytics - QMSS solution supports and processes an enormous amount of data created by users and other systems. Without appropriate means of easily accessing the data, it could be extremely difficult and a time-consuming effort to derive trends and insights on the quality system.
- QMSS Integration - integration options available within QMSS.
- Paying attention to the end user - Typically, the team selecting or creating a QMSS system is made up of multiple areas: IT, Quality, Operations, Purchasing, and more. QMSS should easily be configured to help the end user since they are more than likely not involved in the ultimate decision of QMSS solution.

2.1. The basic elements and requirements for QMSS

Each company has its own specific needs to meet the requirements of the QMS system. Therefore, there are many different QMSS approaches in creating application solutions. However, in general there are some properties that all QMSS have in common and these properties include:

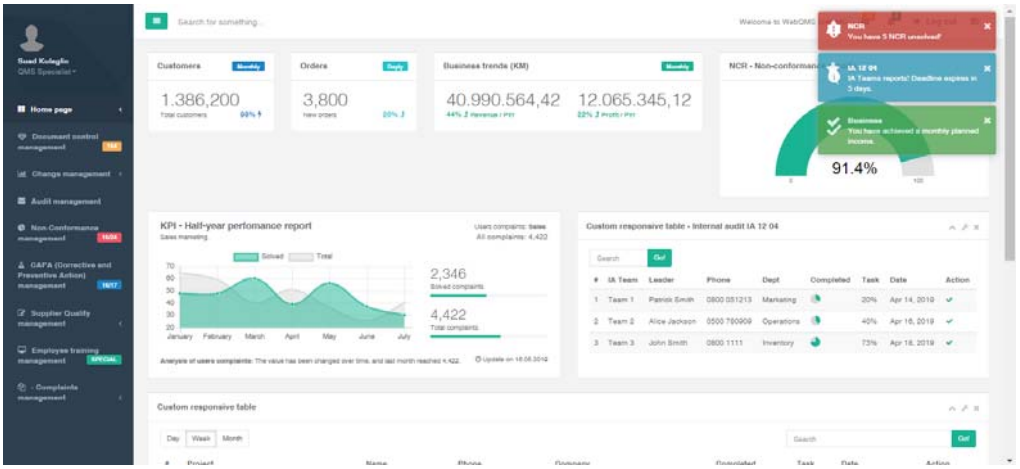
- Management of Data.
- Internal processing of organizational information.
- Customer satisfaction through high-quality products or services.
- Identifying areas for improvements.
- Quality Analysis.

With the aim of the effectiveness and efficiency of the implemented quality system in the organization, it could be listed a few factors that one QMSS should deliver [1]: 1. Accurate information - For each process, policy, or procedure in the company, there can only be one form of correct information and should be available to all employees that have access to it. 2. Easy to process and understand - It would be more convenient for end users if the information was presented in different formats (tables, graphs, panels, diagrams …). The efficiency of newer more advanced systems would allow information to be visually represented for a better understanding for users of the QMSS.3. On-time accessibility - One of the primary reasons for the use of a QMSS is efficiency and the ability to access the relevant information on time in order to be increase organizational productivity significantly.4. Reporting - QMSS should be able to deliver intelligent, powerful, and high-quality reports. These reports could then be used for reference and other essential activities.5. Responsiveness and adaptation to other devices - With nearly every person having a smartphone or laptop in the current world, it would only make sense that the software holding all necessary files would be accessible on other electronic devices as well. 6. Organization - QMSS should be able to provide a basic view for all procedures, documents, policies, and other information relevant to the company in order to have a general overview on how the organization operates and how well they operate.

3. BASIC CONSIDERATIONS ABOUT QMS DASHBOARDS

For QMS dashboard can be said to represent one kind of BI (*business intelligence*) dashboards. In that sense, QMS dashboard is an information management tool that is used to track the most important information in domain of QM system (documents, records, KPIs, metrics …) and other key data information relevant to organisation's business, department, or specific process. Through the use of data visualizations, QMS dashboards simplify complex data sets to provide users with at a glance awareness of current QMS performances. *Picture 1* It should be a great tool for creating and sharing real-time quality management, risk and compliance information across Web browsers, desktops or mobile devices. The essential features of modern QMS dashboard softwares include a customizable interface, interactivity and the ability to pull real-time data from multiple sources. Obviously, these features ensure

that the organisation stay in control of their business critical information and that represents a significant advance over old manual QM systems. [7]



Picture 1. An example of QMS dashboard page - IS4QMS Web application

3.1. Why using JavaScripts and JS plugins?

Javascript (JS) is a dynamic computer programming language. JavaScript (JS) was initially created to "make Web pages alive". It is lightweight and most commonly used as a part of Web pages, whose implementations allow client-side script to interact with the user and make dynamic pages that means that a Web page need not be a static HTML, but can include programs that interact with the user, control the browser, and dynamically create HTML content. They can be written right in a Web page's HTML and executed automatically as the page loads. Scripts are provided and executed as plain text. They don't need special preparation or compilation to run. JavaScript was first known as LiveScript, but Netscape changed its name to JavaScript, possibly because of the excitement being generated by Java and now it has no relation to Java at all. Modern JavaScript is a "safe" programming language. It does not provide low-level access to memory or CPU, because it was initially created for Web browsers which do not require it. In Web browser JavaScript can do everything related to Web page manipulation, interaction with the user, and the Web server. [8] [9]

For instance, in Web browser JavaScript is able to: a) Add new HTML to the page, change the existing content, modify styles b) React to user actions, run on mouse clicks, pointer movements, key presses c). Send requests over the network to remote servers, download and upload files (so-called AJAX technology) d) Get and set cookies, ask questions to the visitor, show messages e) Remember the data on the client-side ("local storage").

The aforementioned application capabilities of JS implementation allow the convenience of creating customized Web application solutions with less server interaction, immediate feedback to end users, increased interactivity and richer interfaces.

3.2. JS Plugin Approach

A plugin is a piece of software that acts as an add-on to a Web browser and gives the browser additional functionality. Plugins can allow a Web browser to display additional content it was not originally designed to display and they allow to define application functionality once and then drop it into projects as needed, getting application up and running faster.

JS plugin is piece of code written in a standard JavaScript file. These files provide useful JS methods which can be used along with JS library methods. There are plenty of free JS plugins available on the Internet which can be downloaded, as for example link: https://www.jqueryscript.net. On these Web pages, JS plugins are usually categorized according to the purposes they will be used for. For the purpose of using into QMS dashboards, the most important ones are those used in the creation and support of basic QMSS applications modules, which are plugins for interactive data input forms, display of data in responsive tables, graphs or diagrams, and interactive notifications or alarms that are important for the timely undertaking of planned activities. Also, very important category of plugins are those that process text documents through various types of text editor. The most popular topic of discussion regarding JS plugins is undoubtedly responsive layouts in Web design since a responsive design allows a specific and optimized screen size based on device (desktop, laptop, mobile, tablet…) the end user uses.

3.3. Using JS plugins in QMSS modules

In general, most QMSS solution consists of the following modules of QM system: a) Document control management, b) Change management, c) Audit management, d) Non-Conformance management, e) CAPA (Corrective and Preventive Action) management, f) Supplier Quality management and g) Employee training management. However, it can be expand to more areas of the business, depending on the QMS needs of the organization.

For creating as well as selecting appropriate QMSS solution it could be interesting to consider using following JS plugins into specific QMSS components in order to maintain a strong level of visibility and control over the quality management system data:

- **Document control management**

The main functions: create and organize all documents into a centralized database, eliminate document redundancy, reduce the risk of out-of-date QMS documents.

JS plugins: for editing text documents or JS Text Editors (fe:***TinyMCE, bootstrap3-wysiwyg, Summernote, CKEditor****)***

- **Change management**

The main functions: to manage, monitor and optimize the change management process in the organization.

JS plugins: to build own diagramming tool or add some graphical modeling functionalities to QMSS software (***JointJS, Rappid, MxGraph ,GoJS, jsUML***)

- **Audit** management

The main functions: facilitate compliance with QMS requirements and industry standards providing management with the data needed to evaluate QM system effectiveness, provide auditors with authoring tools required in the field.

JS plugins: for different data entry forms (fe: ***Parsley, iCheck, jQuery File Uploads, Ideal Forms***)

- **Managing Non-Conformance (NCM)**

The main functions: organization's continual improvement plan, to capture, track and maintain accurate, auditable nonconformance records through a centralized database to have transparency for departments, sites, or locations.

JS plugins: responsive layout or additional functions such as searching, filtering, sorting or other advanced features (***jQuery Responsive Tables, FooTable, jExcel, DataTables***)

- **Complaints management**

The main functions: for customer retention and satisfaction, compliance with standard and industry regulations and requirements, avoidance of potential product liability lawsuits.

JS plugins: responsive display graphs and charts, data pickers, data validation (***D3.js, google.chart, chartJS, n3.js, HighChart.js, FusionChart.js, Flatpickr, Pickadate.js,***

DateRangePicker, Datepair.js BootstrapDatepicker, jQueryFormValidator, Bootstrap Validator)

- **CAPA (Corrective and Preventive Action) management**

The main functions: provide a controlled environment and reduce the risk of repeat issues by ensuring that defined CAPA solutions and processes are met.
JS plugins: for alerts and notifications, creating reports (***alertify.ja, notify.js, bootbox.js, toastr.js, pdf.js, TCPDF.js, jsPDF.js***)

- **Supplier Quality management**

The main functions: manages the process of qualifying, selecting, and monitoring suppliers and supply chain partners.
JS plugins: for timetable, timeline, project schedules (***jQuery Timetable, Pit-scheduler, Bootstrap calendar, jsGanttImproved, jQuery Gantt)***

- **Employee training management**

The main functions: create a single interface to develop and manage training initiatives organizationally, maintain a complete inventory of employee education levels, job descriptions and certification records.
JS plugins: to dynamically generate unlimited quizzes, surveys or presentations (***quiz.js, jquery-quiz.js, Sliding-Quiz, Quizy-Fill, Exam Wizard, JqPool.js, jQuery.Survey, deck.js, weslides.js)***

In this chapter, only a small part of the available JS plugins that can be found on the Internet and used in any Web QMSS application solution and its modules are presented. In this way, the intention of this paper is to point out the possibility of using JS plugins for the purpose of creating QMSS solutions in the domain of quality management as well. The aim was not to consider JS programming language in detail or programming in general, but only to point out the possibility and universality of already made JS programming modules - plugins - that have already been incorporated into any commercial product certainly. Knowledge about their functionality can doubtlessly contribute to a better choice of a ready-made QMSS commercial solution or better preparation for creating a QMSS solution with an organisation's own resources.

4. CONCLUSION

For an organization to move forward in the current competitive market, Quality Management System Software (QMSS) is a great support. There is a constant question to the organisation, whether to buy QMSS software or to start creating their own QMSS system with the resources the organisation has. Many QMSS systems are available in the market today, all with various levels of functionality and features. Some vendors focus on a specific niche, some are more generic. All of them have similar features, but in many cases selecting the right vendor falls into a single requirement - what is right for their business. On the other hand, the question arises as to whether the organization is capable with its resources to create such a solution in a reasonable and acceptable time with adequate characteristics and properties for the established QMS system.
In this paper, we consider the selection or creation of QMSS application solution with a significant impact of the JavaScript plugin technology that can greatly contribute to all of the functionalities of the system to be adapted to the requirements of QMSS modules as well as the end users of the system. Having a well-defined set of these requirements will provide the persons responsible for the QMSS solution with the guide to evaluate these software system as better as possible.
Finally, replacing manual paper-based or hybrid (part electronic and part paper) quality management systems with automated QMSS systems dramatically improves a company's

ability to comply with regulations, requirements and quality standards, while increasing operational efficiency, improving product quality, and accelerating time to market.

5. REFERENCE

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