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# A CRITICAL EVALUATION OF ROLE BASED ACCESS TO ENTERPRISE PORTALS<sup>1</sup>

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## Abstract

*Enterprise portals (EPs) aim at creating a single entry point for its users to all internal and external applications, information, and services necessary for performing their jobs. EPs can be personalized to users depending on the roles they perform. There is a growing interest in EPs, but they have not been researched. Using an artifact-evaluating approach we evaluate one specific EP--SAP AG's Enterprise Portal mySAP Workplace. The evaluation had an overall effectiveness approach due to the nature of the underlying application, i.e. SAP R/3, and the competing values model, developed by Robert Quinn and associates, was used as the evaluation model. The evaluation suggests some of the strengths of current EPs, for example, their internal and control focuses, and some of their weaknesses, for example, lack of external focus and lack of support for top-managers.*

## Introduction

Portals are yet another software type put into use in business organizations. Examples of portals include e-business portals (incl. consumer, community, and market portals), enterprise portals (EPs), and business intelligence portals. Literally, a portal is designed as a single entry point for its user to all the internal and external applications, information, and services necessary for completing their work task. EPs are designed to manage the access to an organization's computer based communication systems and information systems. Access to the systems (EPs) is controlled by the design of the user interface and this design affects the organizational impact of an EP. Although there is a growing interest in EPs, they have not been researched. Hence, the aim of this paper is to evaluate the "user interface" of an EP. To this end we will use an artifact-evaluating approach.

The remainder of the paper is organized as follows. The next section presents EP and briefly the specific artifact we will evaluate, i.e. SAP AG's Enterprise Portal mySAP Workplace. This is followed by a presentation of our research approach, artifact-evaluation. The following section presents the model we will use for the evaluation: Quinn and associates' competing values model (CVM). Section 5 presents and discusses our evaluation of mySAP Workplace. The final section presents limitations and recommendations for further research.

## Enterprise Portals

Consulting and marketing research firms, for example, Butler Group, suggest that EPs will reshape the future of information services and information sharing and there is a growing interest in portals, primarily among software providers, consultants, and firms implementing portals. Early versions of EPs were developed by startups. Recently, Enterprise Systems vendors, such as SAP and Intenia, reacted to business demands and started to develop and deploy such systems. EPs are designed to provide a single access point to internally or externally dispersed applications, information, and services for an organization's employees, partners, customers, and suppliers (Markus 2000). Often an EP is an entry point to information available via the Web or a mobile device and creates a single entry point for its users to all the internal and external information necessary for their jobs. The information, e.g. company newsletters, financial statements, departmental purchasing histories, customer orders, and product

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<sup>1</sup>The authors contributed equally to the design and execution of this research project and paper.

shipments, made available through an EP can be personalized depending on what role/s or function/s a person performs. The applications made available in an EP are the capabilities found in Enterprise Systems, for example in SAP R/3, and the extended versions of them including, for example, e-commerce tools, SCM, CRM, business intelligence tools, and communication tools. The services, e.g. employee self-service, allow a user to maintain its own information. An EP keeps track of who in the organization is authorized to do what, and the EP presents to each user only those resources the user is allowed to see and use. For instance, a customer service representative might have access to certain sell-side e-commerce tools, self-service human resources services, and perhaps, with very low spending limits, to the company “store” for purchasing office supplies. An accounting manager might have access to financial systems, data, and decision support tools, to the store, to the administrative applications, and to communication and personal productivity software.

### ***EP Example - SAP AG’s Enterprise Portal mySAP Workplace***

SAP AG the world leading Enterprise Systems provider has during the past years or so realized several products and concepts in response to the demands for eCommerce solutions and is today providing a wide range of eCommerce products. One of their products is mySAP Workplace, which is in part SAP’s answer to the growing market in EPs, but it is also an user interface to SAP’s other products, e.g. R/3, CRM solution, and supply chain products. mySAP Workplace is not limited to SAP’s products. A user organization might link other applications to the portal that can be accessed through the Web. Hence, mySAP Workplace is both a product and a concept. The actual software--mySAP Workplace--functions as an Internet transaction server and can be compared with Microsoft’s transaction server.

Access to applications, information, and services provided to the users of mySAP Workplace is based on a role based design, with a strong emphasis on the tasks a user has to perform to complete their work. mySAP Workplace includes some 200 role templates. There are no references to how this role-based GUI was designed and has evolved on SAP’s homepages. However, German organizational theory has traditionally a strong link to tasks (Kosiol 1962 according to Keller and Teufel 1998, p. 27), which is a common design feature of all roles. Hence, we presume that this has had an impact on how the system was designed, but in what way is uncertain. The structure of the roles in mySAP Workplace is to be found on their homepage and in the software version 2.11 ([www.sap.com](http://www.sap.com)).

The generic roles, i.e. templates, which control the access to applications, information, and services are divided into different functional categories and different industry solutions that SAP supports. A firm-specific EP is designed from mySAP Workplace’s role-based concept where an organization can pick and choose from all roles.

A role is defined as:

*“... a collection of activities that an employee carries out in one or more business scenarios of an organization. Users access the transactions, reports and Web-based applications in a role via a series of menus. Roles are specific to individual employees and match their specific tasks and service/information needs.”* ([www.sap.com](http://www.sap.com))

Each role within the workplace is described in a task-oriented manner, for example:

Role: Manager Generic

Tasks: *“The Manager Generic is responsible for controlling and monitoring goal-oriented planning and decision-making processes and for pursuing strategic goals in his/her area of responsibility.*

*He/she fulfils the function of a line manager who can be placed on various hierarchical levels in an enterprise and - with the exception of the activities of the project manager, for which there is a separate composite role - can cover many different task areas. He/she controls personnel management processes in his/her area, and is responsible for a cost center and for project assignments of the people in that area.”* ([www.sap.com](http://www.sap.com))

Further each role is unique in some sense, since an organization or the actual user may configure the role by adding or deleting functionality to one’s own specific requirements, for example, information reports, access to other applications, or even add other roles into the existing role.

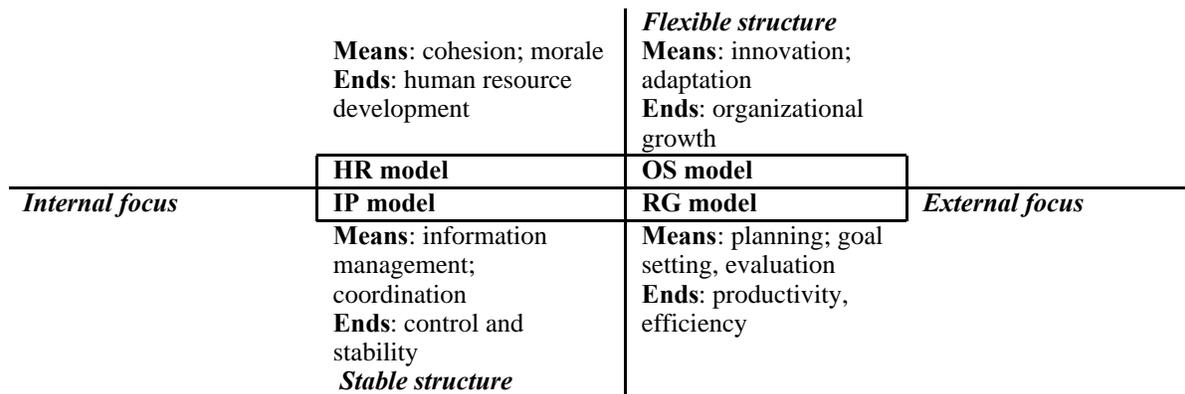
## **Artifact-Evaluation**

The aim of this paper is to evaluate EP and this is done through an evaluation of the role-based user interface. The research approach taking belongs to research stressing artifact utility, which can broadly be divided into artifact-building and artifact-evaluation approaches (Järvinen 1999; 2000). Although critical, this type of research is not well represented in IS research (Järvinen 1999; 2000; March and Smith 1995; Lee 2000). Artifact-building focuses on questions like: Is it possible to build a

certain artifact; how ought a certain artifact be and how can we build a certain artifact? An artifact can be, for example, a construct (concept), model, method, technique, or instantiation of an information system. In evaluation of an artifact some criteria are used and some measurements performed. In general, questions like "How effective and efficient is this artifact" are asked and answered. In artifact-evaluation one can use a model to evaluate the effectiveness and efficiency of an artifact. In order to make the evaluation of the roles and thereby the EP we had to make a choice of an evaluation model. We chose Robert Quinn and associates' competing values model (CVM) (Quinn and Rohrbaugh 1981; 1983; Quinn et al. 1996). There were two main reasons for using the CVM. First, it is a well-established framework and model and it has been developed and empirically tested in organizational (Buenger et al. 1996), management (Hart and Quinn 1993), and IS research (Sääksjärvi and Talvinen 1999) over a number of years. Second, it is related to a critical construct: individual and organizational effectiveness. Later versions and extension of CVM for assessing management competence and diagnosing organizational culture were evaluated. They were found to not be proper for this evaluation, due to their shortcomings regarding lower level efficiency. Other evaluation models would of course be possible, i.e. usability evaluation or TAM (Technology Adoption Models). However these evaluation approaches have been used in research where there has been actual use of a system. In our evaluation we did not evaluate actual use, because of lack of access to actual use of the role-based concept. This is the main reason for conducting an "experimental" approach instead of evaluating actual use.

### The Competing Values Model

The competing values model (CVM) is a framework of organizational effectiveness and includes some theoretical underpinnings of organizations (Buenger et al. 1996; Quinn and Rohrbaugh 1983). First, CVM views organizations as purposeful systems that exist to achieve certain goals or ends (Daft 1992; Perrow 1986; Scott 1992). Second, CVM acknowledge the existence of simultaneously and conflicting goals, which an organization must attain at the same time in order to be effective (Hart and Quinn 1993). Furthermore, CVM is based on the hypothesis that there is a tension between existing underlying values in organizations (Buenger et al. 1996; Quinn and Rohrbaugh 1983). The first value is focus; internal focus puts emphasis on well being in the organization while external focus is on environment. Structure is the second value dimension; stability refers to the need of top management to control and flexibility refers to adaptation and change. The last value concerns ends versus means in effectiveness criteria (Quinn and Rohrbaugh 1981; 1983). The values reflect similarities to four organizational models with respect to different constructs of organizational effectiveness. The four models are human relations model (HR), open systems model (OS), internal process model (IP), and rational goal model (RG). Based on the four organizational models (HR, OS, IP, and RG) and the underlying value dimensions different organizational effectiveness criteria has been linked to each model (Figure 1).



**Figure 1. Competing Values Model (Quinn & Rohrbaugh, 1981; 1983: Rohrbaugh, 1981)**

The HR model is characterized by a focus on internal flexibility to develop employee cohesion and morale. It stresses human resource development, participation, empowerment, teambuilding, building trust, conflict management, listening and being supportive, internal communication, developing individual plans, feedback to individuals and groups, and developing management skills (Quinn 1988).

The OS model is characterized by a focus on external flexibility and relies on readiness and flexibility to gain growth. Important issues are acquisition of scarce resources, support of interaction with the external environment, identification of major trends, business intelligence, developing mental models, facilitates changes, research and development, identification of problems, influencing the environment, and maintaining external legitimacy through a network of external contacts (Quinn 1988).

The IP model is characterized by a focus on internal stability and uses information management, information processing, and communication to develop stability and control. This is done by collection of data, mainly internal and quantitative information used to check organizational performance, enhance the understanding of activities, ensure that standards, goals, and rules are met, maintaining organizational structure and workflow, coordinating activities, as well as collecting and distributing information internally (Quinn 1988).

The RG model is characterized by a focus on external control and relies on planning and goal setting to gain productivity. This includes clarification of expectations, goals and purposes through planning and goal setting, defining problems, generating and evaluating alternatives, generating rules and policies, evaluation of performance, and decision support, quality control, motivation of organizational members to enhance productivity, sales support, and profit maximization (Quinn 1988).

## Evaluation of an Enterprise Portal

Few firms have implemented EPs using the role-based concept to a large extent. We decided to evaluate the "whole package" of roles provided in mySAP Workplace. We used SAP's web pages to find the different roles and description of the roles. Altogether we found 433 individually labeled roles. Of these approximately 200+ are implemented (the data collection was done in September, 2000). From the 433 roles, we excluded all roles associated with the industry solution of SAP Healthcare and were left with 359 roles. Then we took away doublets and non-classifiable roles and ended up with 329 roles. The evaluation of the remaining 329 roles was done in a four-step process:

1. We listed the 329 individual roles found. On SAP's web pages, the roles are listed under each industry solution and are structured into categories.
2. Each role was categorized along the value dimensions - internal versus external and stable versus flexible. An example of a role is billing clerk. The tasks a billing clerk moderates is:

*"the entire procedure for billing document processing, that is, the processing of invoices, credit memos, debit memos and cancellation documents. He is responsible for insuring that the invoices are correct and complete. The billing clerk carries out the following tasks:*

- *Entering and processing of invoices, credit memos and debit memos*
- *Invoice verification*
- *Creation of invoice lists, lists for credit memos and rebate agreements*
- *Creation of lists for sales orders blocked for billing*
- *Release of sales orders blocked for billing*
- *Settlement of rebate agreements."* (www.sap.com)

These tasks were classified as belong to the IP model, since the task is measured mostly with internal effectiveness measures.

3. Each role was mapped into the CVM with regard to the value dimensions.
4. Each role was evaluated regarding its hierarchical level using the following five levels: top-management, middle, operative and support personnel, experts and specialists, and outsiders. This classification of the hierarchical belonging of each role was based on the researchers' intersubjective judgment.

Two researchers did the evaluation and classifying independent of each other (working through step 2-4 independently). The two classification and evaluation outcomes were compared. Approximately there was an 80% agreement between the two evaluations (some roles were question-marked in the evaluations). Where non-agreement existed, the two researchers evaluated the roles again and a final classification and evaluation decision was made. The outcome of the classification and evaluation of the roles is depicted in Table 1.

**Table 1. Evaluation of the Role Based Concept**

CVM	Top	Middle	Operative	Experts	External	Total
Internal Process	3	77	83	21	0	<b>184</b>
Rational Goal	4	33	46	23	8	<b>114</b>
Human Relations	1	2	2	2	0	<b>7</b>
Open Systems	5	8	2	9	0	<b>24</b>
<b>Total</b>	<b>13</b>	<b>120</b>	<b>133</b>	<b>55</b>	<b>8</b>	<b>329</b>

### **Outcomes of the EP Evaluation**

Most of the EP roles map to the internal process (IP) model and the rational goal (RG) model, with more roles mapped to the IP model. Accordingly, most of the EP roles support IP and RG associated organizational goals. Hence, the EP-roles primarily support roles related to efficiency and productivity, and means such as coordination and planning. The hierarchical evaluation showed that primarily operative and middle management roles are supported. Reasonable since they are likely to support the same goals as for the IP and the RG model. The strong support of IP is natural since one primary task ES that also underlies these roles is master data, which refers to the work of creating master data records for e.g. customer, vendor, and material etc. This capability is used as a repository for datum and makes it possible to communicate information through an organization; this is what makes information integration possible. However the lack of support of human resource and open system was a surprise. The conclusion of the artifact evaluation or mapping between the underlying task description of each role and CVM show the existence of a in part shared implicit framework as CVM, and the roles include the same organizational effectiveness criteria and can be sorted along the value dimensions.

### **Discussion**

Our evaluation suggests what organizational models with their associated roles that are supported by the evaluated EP (mySAP Workplace). The evaluation suggests that the CVM-roles associated with the IP and RG models are the roles primarily supported by mySAP Workplace. It would be tempted to suggest that the EP is less good because it seems that there exists an unbalanced support of CVM-roles. Such a suggestion would be based on that a well-balanced support is good. But, such a suggestion misses an important aspect: the context of where the EP is to be used. Studies within the CVM framework suggest that all roles are not equally important and critical. There are changes in the importance of the roles in relation to hierarchical levels and what state a firm is in. Quinn and Cameron (1983) found, in relation to the CVM framework, four different states a firm can be in, namely: 1) entrepreneurial, 2) collectivity, 3) formalization and control, and 4) elaboration of structure state. In the entrepreneurial state the roles in the OS model are the critical roles and in the collectivity state the roles in the HR model are the critical roles. In the formalization and control state the roles in the IP and RG models are the critical roles. The elaboration state has a more balanced emphasis of the roles. Based on Quinn and Cameron's findings, we can hypothesize that the evaluated EP will be more effective in firms in the two latter states.

In another study it was found that there is also a difference in the importance of the roles in relation to hierarchical levels (Quinn 1988). Two major findings in the study was that: 1) there exists an equal emphases for the monitor (IP), coordinator (IP), and director (RG) role, and 2) the importance of the two OS-roles increases as we move up the hierarchical levels. In relation to our classification, the first finding suggests that although the EP seems to support the IP and RG roles it does so better for middle and lower level managers than for top-managers. The second finding and our classification suggest that an important improvement of the EP for top-managers would be to better support the roles associated with the OS model. Another improvement, important to all levels would be to enhance the EP in its support of the roles associated with the HR model.

### **Limitations and Further Research**

This paper presents an evaluation of the role-based concept of an EP from an accepted framework of organizational effectiveness. The purpose of the evaluation is to understand how EP systems might support organizational effectiveness.

Important delimitation of the approach is that the following aspects are not taken into account in the evaluation of the EP. First, the value of the role in context--some roles are more important than others. Second, the impact of the environment and technology of the user--some roles are more important than other dependent on the environment and technology of that organization. Third, the number of each role in an organization--its likely to assume that some roles will have several users.

The evaluation of the roles can in future studies be done by field study of actual use. Due to the newness of mySAP Workplace it was hard to find actual use cases that could be related to Quinn et al's effectiveness construct. Further research on EP might include studies on the design and use of roles in both context and development environment. Research on actual implementation and use and effects of use is critically needed.

The evaluation can be used as a tool for supporting implementation by enhancing or enabling a better communication between designers and users. This is achieved by using the evaluation for discussing organizational requirements of EPs and related improvements on organizational effectiveness. The focus is on organizational requirements, motivated by organizational effectiveness.

mySAP Workplace can be considered as one approach to personal information management. In future studies it can be evaluated from this perspective and be compared with other approaches to personal information management. mySAP Workplace's possibility to support users' mobility can be addressed in future studies. In this case, mobility will include both technical mobility (to different places) and social mobility (out and in of different roles and contexts).

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