

## Criteria for the selection of ERP software

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*The implementation of an ERP software package is an important investment for an organization, which is characterized also by a high degree of risk. Selecting the most appropriate software is a necessary condition for a successful implementation. This paper is describing the major aspects of software selection in general and the relevant criteria in the case of ERP software.*

**Keywords:** ERP, software, selection.

### **I**roduction

Software selection is a topic concerned with the process, methods and tools applied by organizations in order to decide which software they choose from the wide range of available solutions on the market. Such a decision must be taken very carefully, as the adoption of software solutions is having an important impact in the medium and long term. This impact is related to purchase and operating costs, but also to the way the software is helping the company to build competitive advantage.

The selection of a software application can be understood as one of the steps in the process of software acquisition by the company [4]. This wider process includes the stages of: planning, information search, (pre-) selection, evaluation, choice and negotiation. During the planning process, the acquisition team is formed. This team addresses as many issues as possible related to the other stages. During the information search stage, information about technologies and vendors is found and screened and its sources are evaluated. During the (pre) selection process, a shortlist of possible vendors and technologies is created. The elements of this list are evaluated in the next stage, which incorporates vendor, functional and technical evaluation. The choice stage is the result of the evaluation process. A final recommendation is made, followed by a negotiation process, which could be concluded by a final contract. The planning activity involves the definition of requirements and the identification of selection / valuation criteria, both of which are relevant for the software selection process.

ERP Software is a generic term for Enterprise Resource Planning Software. ERP covers a range of activities for improving business efficiency across a number of departments in an organization or enterprise. These departments may include manufacturing, sales, marketing, purchasing, production planning, inventory control, shipping and distribution and even maintenance through a CMMS (Computerized Maintenance Management System).

ERP software is therefore very complex and arguably the most difficult software application to select. The acquisition of this type of software package is a high-expenditure activity likely to consume a significant portion of an organization's budget.

The high risk levels for such acquisitions is obvious, as a wrong decision can affect the organization as a whole, in several different areas and on several different levels - even to the point of endangering its existence. The praxis shows that, in a significant number of cases, the companies fail to obtain the expected benefits from an ERP system. Therefore, the definition of appropriate selection criteria play a critical role in the acquisition of ERP software.

### **Criteria for selecting ERP software**

Practically all evaluation methods rely on the application of evaluation criteria as basis for selection; based on the values obtained by the candidate software packages for each criterion, an aggregate score can be calculated, which is used for the ranking of candidates. The most used technique is AHP – Analytical Hierarchical Process, in which the criteria are

structured as a hierarchy, and specific weights are defined for each level in the hierarchy.

The criteria to be used for ERP software selection, as presented in the literature, include several categories of criteria. One such structuring, presented by [2] includes six categories:

- functionality – the coverage of functional requirements,
- technical architecture – technical requirements, including integration with existing systems
- cost – both for implementation, maintenance and further adaptation / extension
- service and support levels provided by the vendor
- ability to execute
- vision

Most authors also include the vendor evaluation as a significant criterion. However, there is no standard regarding the defined categories and criteria. Further, a recommended set of criteria for the selection of an ERP solution is presented.

When finding and selecting ERP software, the following main functions should be considered: Customer and Order Management, Purchasing Control, Production Schedule, Ingredient List, Inventory Management, Interface with CMMS system, Reporting and Analysis, Integration with Accounting System, Payroll and HR (Human Resources).

The software evaluation process uses a number of factors that can be consider in specifying the application software. This factors are: general requirements, administration and security, reporting, Web access and integration, vendor characterization and cost (of the software and associated support and services).

General requirements are related to:

- Operating System - requirement for a particular operating system
- Database format - requirement for a particular database system
- Data import or export – the capabilities of export or import data in/from other software packages.

- The look and feel of the application – requirements for standard windows processes and procedures?

- Filtering and searching friendliness (this applies to database software) – existence of several optional ways of finding data that the users will need.

- Look-ups – Look-ups are tables or drop down lists that offer a selection of data to choose from when using the system.

- User configurability of look-ups and lists - the lists and drop downs mentioned above to be user configurable.

- User configurability of tags and labels

- Handling of links to ancillary information - the system should meet the requirements with respect to its handling of links and hyperlinks to external records and information.

- Required number of concurrent users. - does the application support the required number of users? Concurrent users are users that are logged on to the system at the same time or not.

- Archiving requirements. - archive the data for a number of years.

- Existence of barcoding, PDAs and remote devices – if are necessary.

- Single or multi-site functionality – the possibility that the application support multi-site operation or it will be installed on a single site

- Graphical, hierarchical data structure - database systems which display a graphical representation of a hierarchical structure (parent/child relationships) are generally preferred.

- Regulatory compliance support – if in user industry are there any statutory standards to which the software must comply

- Ease of implementation –the work required to implement the software

- Additional database software required - some applications require that licenses are purchased for additional database software.

- System maintenance required

- Paperless systems - most applications generate paper reports or other hard copy.

- Access to data from various areas - system users may require to log on and input or

check data from any work station that has the application installed.

- Equipment history - display of equipment maintenance history over time should be easily achieved is an important capability of software.
- Simple login process - login should be achieved quickly and effortlessly.
- Speed of access and response time
- Customizable screens - allow the administrator to hide specific fields from defined users. This is not a security function, but is only used to simplify the screens for certain users, hiding those fields that they do not use.
- Resourcing - all software applications require resources to keep them running and administer them.
- Alternative Languages – the existence of the support of alternative languages,

**Administration and security requirements** are related to:

- Ease of use - Administration of the security features of some software systems can be very complex. The application should have an useable administration module.
- Tabular selection - Many security modules offer a table of functions for which permissions can be granted to each user or group. This is normally done by checking or ticking the relevant permissions boxes for each user or group.
- Password - Users should be allocated passwords. This need not necessarily be done on an individual basis. For example it may be enough for all people doing the same job and in the same section to have the same password.
- Individuals and group settings – it should be possible to set up individual users ID's as well as user groups. This allows users who require the same access level to be placed in the same group.
- Audit trail - an administration audit trail can be required, that would provide traceability to individuals for all changes to the administration and security module.
- Customization - Application customization should be easy for the administrator. For example configuration of screens and user con-

figurable data should be intuitive and not requiring a high level of IT knowledge.

**Reporting requirements** are related to:

- Ease of access to reports - Reports must be easily accessed and found on the system.
- Data export capability - Many systems provide a data export facility. For example they may allow to export data to MS Excel.
- Customizable reports - Customizable reports allow the user to modify existing reports and save them as additional reports. This is much easier than creating reports from scratch.
- Format of reports (graphical/text) - What functionality does the application have with respect to its handling of report output? Does it allow data to be displayed graphically?

**Web access and integration**

- Purchase or rent - Who owns the software? This is an important factor as some web based systems can be purchased and installed on your own Intranet. Others are rented and installed on the vendor's servers.
  - Data ownership - Is there any ambiguity with respect to the ownership of the data?
  - Functionality - Due to limitations in the programming of web browser based systems some of these packages have limited functionality.
  - Response Speed - Is the response time of the software satisfactory?
  - Company stability - a mechanism should be in place to recover the data if the vendor company is going out of business.
  - Cost analysis – In case of renting web based software the cost against that of buying a web based package for installation on your Intranet should be assessed.
  - Internet access - Do all the PC's in a web based system already have Internet access, and if not what will this cost?
  - Customization - Web based software must often be used without customization. If this is the case, will the application meet the requirements in its standard form?
- Vendor characterization**
- Stability - each vendor's stability must be assessed. How long have they been in business? How long have they been selling this

type of software? When this application was first developed? How many local and international clients do they have for the application?

- Professionalism - assess each vendor for the professionalism displayed in dealing with the client's inquiry and in demonstrating their products.

- Service level agreement - assess each vendor for the level of future service and support that they offer. Do they provide telephone support at the times you require it? Do they provide online help? What does it cost for the level of service that you require?

- Provision of customization - if the application will be customized, each vendor should be assessed for the service they offer in this and costs involved.

- Upgrade path - if the application is an entry level system that may be upgraded in future, assess the vendor for the upgrade path offered and cost of these upgrades.

- Customer base - how many packages has the vendor sold and who buys them?

### Costs

- Cost of software - assess the application for total cost for the configuration and number of users required

- Cost of hardware - the total cost of any additional hardware required to make the implementation work with the application

- Potential future cost - assess for potential for significant future costs.

- Implementation cost - installation of the software and consultancy.

- Training cost - assess for training costs involved in implementing this application

- Cost of customization - assess the application for any costs involved in customizing it for your requirements.

### Conclusion

The presented criteria can be used as a basis for the selection of an ERP software package. Still, simply applying such criteria in a formal manner does not guarantee the most appropriate choice. It is suggested that, before the criteria are established, a proper identification

of the selection objectives is necessary [3], so that the real needs to be fulfilled by the software are stated. Furthermore, a large number of criteria may prove to be inefficient, and it is recommended to filter the most significant criteria for evaluation.

The evaluation of a single criterion should be based, as far as possible, on facts rather than opinions or impressions. This is made difficult by the ambiguous formulation of criteria, e.g. "friendly user interface".

Studies of the selection criteria used by companies have shown that there are differences between mid-sized and large companies, related to the relative importance of selection criteria [1]. For example, cost and adaptability were considered more important by medium companies, and integration aspects with customers and suppliers, internationality were more relevant for larger organisations. The final list of criteria to be applied should hence be established by each organisation according to its specific situation and needs.

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