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Designing an MIS Database for Selection and Recruitment

Umakant Mishra

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By- Umakant Mishra, Bangalore, India

http://umakantm.blogspot.in/

Contents

1. Importance of Selection and Recruitment

Good and efficient people remain behind the success of any organization. The HR (Human Resource) unit is responsible for hiring good employees for the organization. The main HR functions in an organization are:

⇨ Selection and recruitment – of candidates with right skills in right positions in the organization

⇨ Performance appraisal - to motivate employees to work harder than others convincing that their additional work will be recognized by the organization during performance appraisal

⇨ Rewards and punishment - to ensure that the sincere and hard working employees are appropriately rewarded and compensated.

⇨ Creating pleasant working environment- to ensure that the organizational environment is easy and fun loving and free from quarrels and tensions.

⇨ Retaining employees- one of the objectives of HR department is to retain the good employees for longer period.

⇨ Skill development- to ensure that the skills of staff are developed appropriately while they are in the job

⇨ Building reputation- last but not the least is to build a good reputation for the working environment of the organization

1.1 The growing need of selection and recruitment

While the HR department has several functions as above, the selection and recruitment is one of the key functions with growing importance. Many small to medium organizations are having special HR units to take care of recruitments. Many placement agencies are running their full time businesses to find good candidates for different companies. Many job searching websites have come up to cater the needs of both job seekers and providers. The importance of selection and recruitment grows because of:

⇨ High staff turnover – an average of 20% staff turnover per year can lead to massive recruitment operations for the organization.

⇨ Growth of the organization- a growth rate of even 10-20% in manpower will require significant amount of recruitment operations.

⇨ Keen competition- every organization wants to beat the other by employing efficient and dedicated employees.

1.2 Difficulties in selecting right people

However it is not so easy to find right people to recruit in the right place. The nature of difficulties in hiring right candidates varies with the type of organization, job requirements and other conditions.

⇨ Some organizations with high reputations are flooded with large number of applications. Although they don't face problems in finding candidates they face the challenge of selecting the right people from numerous applicants.

⇨ Some new and unknown organizations don't get good candidates. They have to struggle a bit for finding candidates from different sources.

⇨ In some cases although there may be a large number of applicants the nature of job is so different that nobody skills matches with the required skills.

⇨ Managerial jobs involve complex functions and it is generally difficult to find effective managers. Before selecting managers, the organization has to be sure that it can rely on the selected managers.

⇨ Some organizations recruit very efficient candidates. But most of them apply for new jobs and leave the organization. [1]

1.3 The process of selection and recruitment

Selection and recruitment is a continuous process in every organization. The process of selection and recruitment generally involves the following activities.

⇨ Informing and attracting the candidates (informing the job vacancy through online advertisements, news paper advertisements and other advertisements, company websites, word-of-mouth, campus interviews and other means.)

⇨ Receiving resume and classifying candidates according to their skills. (Every job involves different tasks and requires different skills. It is first necessary to match the skills of the applicants with the job requirement.)

⇨ Preliminary short-listing the candidates (The first step of selection is elimination. As there can be hundreds or sometimes thousands of applications for a job the first step is to eliminate as many candidates as possible.)

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[1] Many people have better skills to present themselves and convince the recruiter about their capability. Those people don't continue long in the organization as they find it easier to convince another employer than delivering the promised jobs.
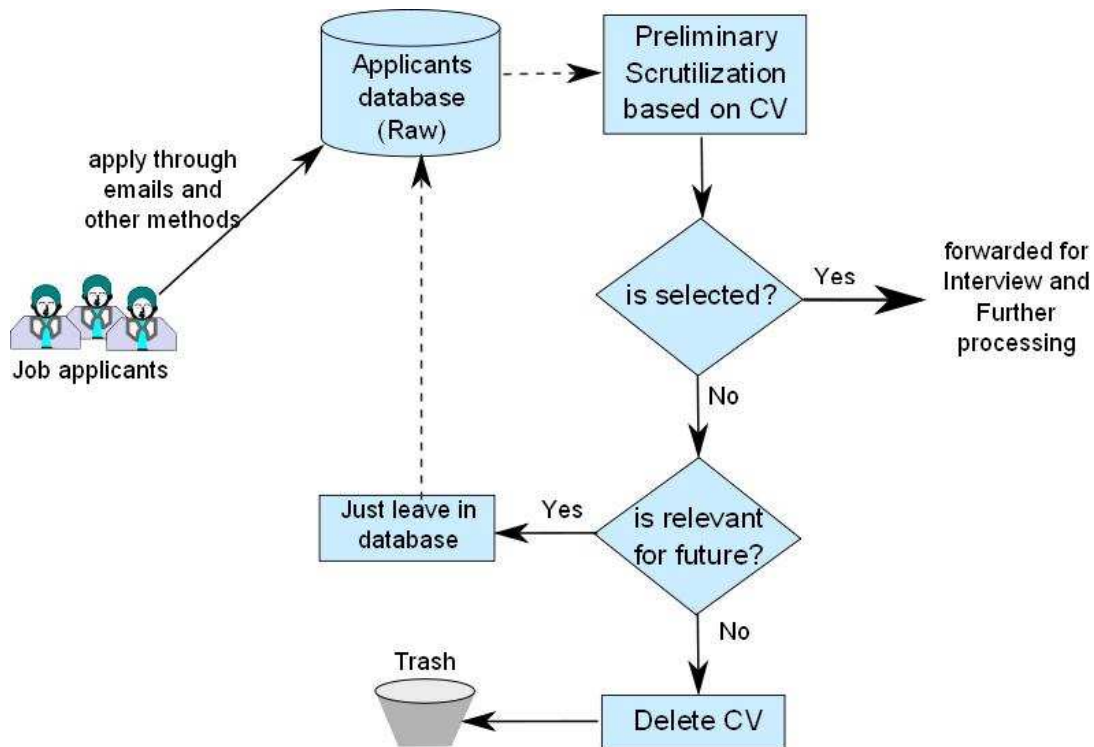
The first step of selection is elimination

⇨ Calling the best-selected candidates for a written or aptitude test (This step has a dual purpose of eliminating the weaker candidates and selecting the stronger ones).

⇨ Inviting the selected candidates for an interview (The interview may be with a single interviewer, a panel of interviewers, a series of interviews, telephonic interviews, video conferencing, interviews followed by group discussions etc.)

⇨ Final interview with the Director or Executive Director or CEO or VP or somebody of similar position (This step is to reassess the selection process, negotiation of salary package and familiarization).
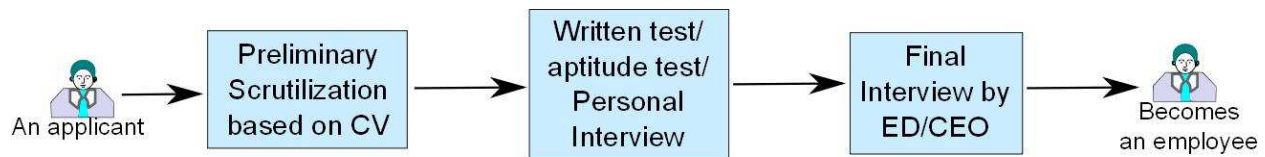
A typical recruitment Process

However, every organization does not follow the same process for selection and recruitments. While some organizations collect applications directly from the candidates some others depend on the expertise of external recruitment agencies to find suitable candidates.

2. Role of IT in selection and recruitment

Information Technology plays a significant role in every step of the selection and recruitment process. For example,

⇨ The job vacancies are advertised in electronic media and websites.

⇨ The applicants apply through emails, filling up online application forms etc.

⇨ The HR manager stores applicants' information in spreadsheets and databases for sorting, searching, filtering and grouping of the candidates on different criteria.

⇨ Online testing and assessment of technical and/or administrative skills of the candidates.

⇨ Conducting distant interviews through video conferencing.

⇨ Recruitment analysis such as gaps between advertisement and recruitment, ratio of vacancies and number of candidates interviewed etc.

⇨ The best example is the job related websites[2] that have popped up during last decade and hosting millions of job applications to help the job seekers and the recruiters.

⇨ Social networking sites (e.g., Facebook, LinkedIn etc.) also slowly started influencing the selection and recruitment process.

2.1 The data pertaining to selection and recruitment and IT tools used

As we discussed above the first step of a selection process is to make a list of candidates applied for a vacancy. With the popularity of computers and Internet every organization is now using at least emails and spreadsheets to maintain the applicants' data. The list may be maintained by the HR manager internally or may be managed by a placement consultant.

However large lists of job applications cannot be maintained in spreadsheets. Hence some organizations maintain such lists in databases and manage by customized software having features for sorting, filtering and organizing candidates for different jobs based on their skills. A multi locational company may go for a web based application for maintaining a resume database for selection and recruitment of candidates.

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[2] There are many online job sites, such as, www.monster.com, www.jobcentral.com, www.job.com, www.career.com, www.naukri.com etc. to mediate job seekers and employers.

2.2 The problem of managing Candidates' data

There are several problems faced by an HR manager while handling the candidates' job applications. The first problem is that the candidates may send their job applications/ resume through different formats/methods such as:

✓ Emails and attachments

✓ Personally handing over a printed CV in the office

✓ Sending applications/ resume by post

✓ Filling up the online application format

✓ And other methods

Each of the above may have further complicacies. For example, some candidates may type (or paste) applications and CVs directly in the body of the email. Some candidates may send applications through emails and CVs as attachments. In some cases both application and CV may come as attachments. In some cases there may be multiple attachments, short profile, detail profiles etc. Besides the attachments may be in different formats, such as, MS Word, Open Office, PDF and others.
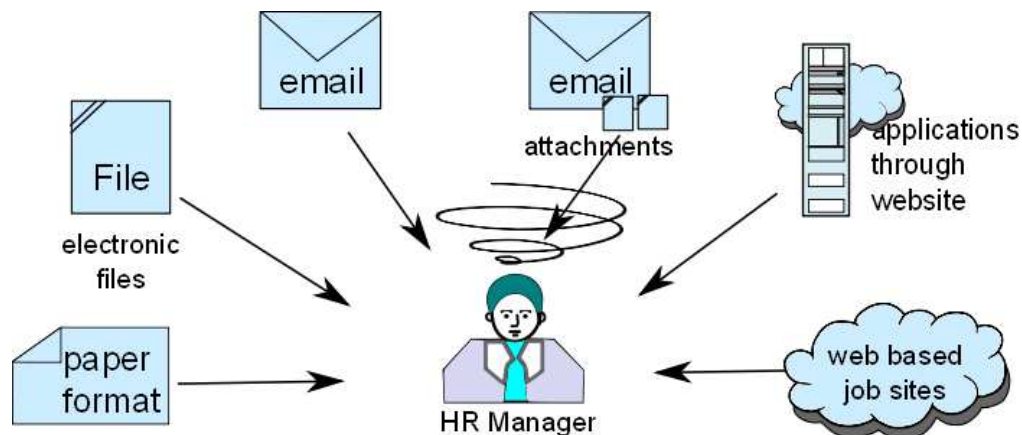
⇨ The number of applications goes on increasing and very quickly reaches to several thousands.

⇨ Although email clients can handle large number of emails and provide searching features, there is no easy method of searching through the attachments.

⇨ Many candidates apply repetitively thus causing many duplications

⇨ Applications come in different formats, printed papers, electronic files, emails, email attachments, web-based forms, reference from jobsites etc.

⇨ Applications at different times may remain in different computers

⇨ Feeding all the applicants again into a new database becomes nearly impossible

HR managers adopt several methods in order to get rid of the above difficulties.

⇨ Maintain a list of only the short listed candidates in spreadsheets. The number of short listed candidates is generally less and useful for MIS purposes (however the number can grow with time when added up in successive interviews).

⇨ Use customized software to feed all the applicants' data (however it involves enormous data entry and processing work)

⇨ Taking help of placement consultancies who already maintain their large resume databases. In this case the HR manager doesn't have to maintain a list of all the applicants.

⇨ Sourcing from online jobsites, social networking sites etc.

3. The MIS data on selection and recruitment

Selection and recruitment is one of the key functions of HR department and every HR manager must maintain a database of applicants in some form or other. The database may be small or large, temporary (for one recruitment) or continuous (for successive recruitments), organized (in one format in one computer) or disorganized (in several formats in several computers).

Although the HR manager may avoid maintaining a large database of all the applicants (because of the difficulties mentioned above) she has to maintain a small database of candidates who are being called for interview or who have been interviewed. This information is important for the management to refer in future interviews and is considered as a part of Management Information System (MIS). This information helps the management to compare between different interviews and to avoid candidates who have been found to be poor in previous interviews.
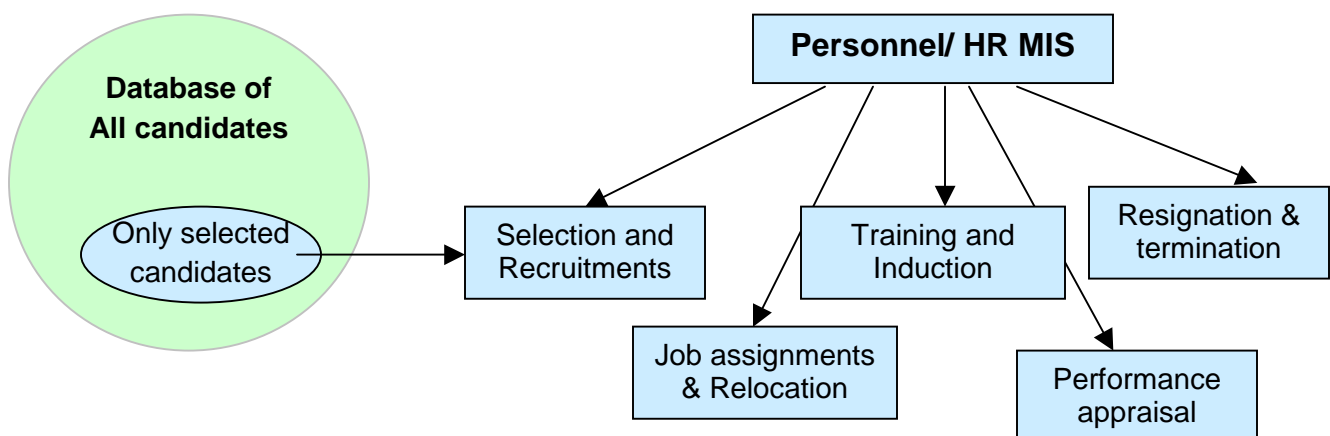
3.1 Comparing the candidates' database and candidates' MIS database

This database of recruitment MIS is different from the candidates' database. While the candidates database is typically large in size consisting of thousands of resumes, the candidates' MIS database doesn't grow so much as it includes only the selected and interviewed candidates. Maintaining a smaller database of selected and interviewed candidates becomes small and handy and found to be very important to refer in future interviews.

	Database of all candidates	Candidates' MIS database
1	Typically thousands in number and can grow to millions	Typically hundreds in numbers and may grow to thousands
2	Only few organizations can afford to manage such huge data	Every organization must maintain this data for MIS purposes
3	Useful for preliminary selection of candidates	Useful for final selection and future selection of candidates
4	This has to be entered by somebody (or copied and pasted from resumes).	The candidates' data may be carried forward from the candidates' database if maintained.

3.2 Advantages of maintaining a selection and recruitment MIS

MIS is useful for every functional department of management and so also for Human Resource department. As we discussed above selection and recruitment is a key function of HR and maintaining recruitment MIS is definitely useful for the management.

- ✓ As all the pre-selected candidates are available in the database it helps quick searching of resumes. For example, the database can be searched quickly to find out potential candidates whenever there is a new requirement

- ✓ It helps rejecting the candidates who have been interviewed earlier. There will be no mistakes of calling candidates again who were found not suitable in a previous interview(s).

- ✓ Easy to recall candidates who were found suitable but could not be recruited because of reasons like vacancies filled up or the person was not available immediately or salary negotiations or conditions which don't hold good any more.

- ✓ As the information will contain the interview results it will have advantages to be compared and referred in future interviews.

- ✓ As the contact address of all the potential candidates are available in a single database any of them can be contacted easily and quickly without searching their addresses from their paper applications, emails or raw files.

3.3 Disadvantages of not having a recruitment MIS

Just storing data on computer files is not MIS. There should be a process of maintaining it and a control mechanism to make it accessible to different key people in the management. An HR manager may store similar files in spreadsheets or other different formats in computer but that is not called MIS. That is because the data becomes available only to the person who maintains it, such as, to the HR manager. Whenever there is a requirement of such information by any other senior manager they have to request the HR manager for that information.

Besides the MIS is supposed to be maintained in an organized way. Even if the HR manager maintains the final interview lists in spreadsheets, the data becomes unmanageable after several interviews for various reasons. In many cases the manager looses he data in operational mistakes and system crashes.

Even if the HR manager is capable of maintaining the computerize data it remains like a personal data. There is no effective way to share this data with other senior managers in the organization. **In most cases all that information vanishes when the HR manager leaves the organization.**

3.4 Features of selection and recruitment MIS

As we discussed above the MIS is meant for the higher management of the organization there is no need to capture transactional data in MIS. Ideally the recruitment MIS should require minimum effort on data entry and administration and provide maximum benefits to the management.

- ✓ Capture MIS data should be above the operational level and should not interfere in the regular activities of selection and recruitment. For example the HR manager can continue its own practice of collecting CVs either through emails or job-sites or in whatever form she is used to.
- ✓ If the HR manager is taking the help of external placement agencies she can continue doing that. If the placement agencies are conducting preliminary screening/ interviews they can even continue doing that.
- ✓ Analysis of MIS data may suggest changes in the process of selection and recruitment in the long run.

While the above paragraphs describe the advantages of maintaining a recruitment MIS it is now important to define which candidates may be entered in to the MIS database.

- ✓ The candidates who have already been called for interviews

- ✓ The candidates who are selected to be called for interviews

- ✓ The candidates who are recommended through reliable sources (referrals)

- ✓ The candidates who are found to be suitable for various key positions

- ✓ The candidates may be for any kinds of job, such as, desk job, field work, long term assignments, short term assignments, consultancies etc.

- ✓ The results of written tests/ interviews after a written test/ aptitude test/ personal interview is over

- ✓ The descriptive results (including remarks of interviewers) of all the candidates who goes through different stages of interview whether selected or not.
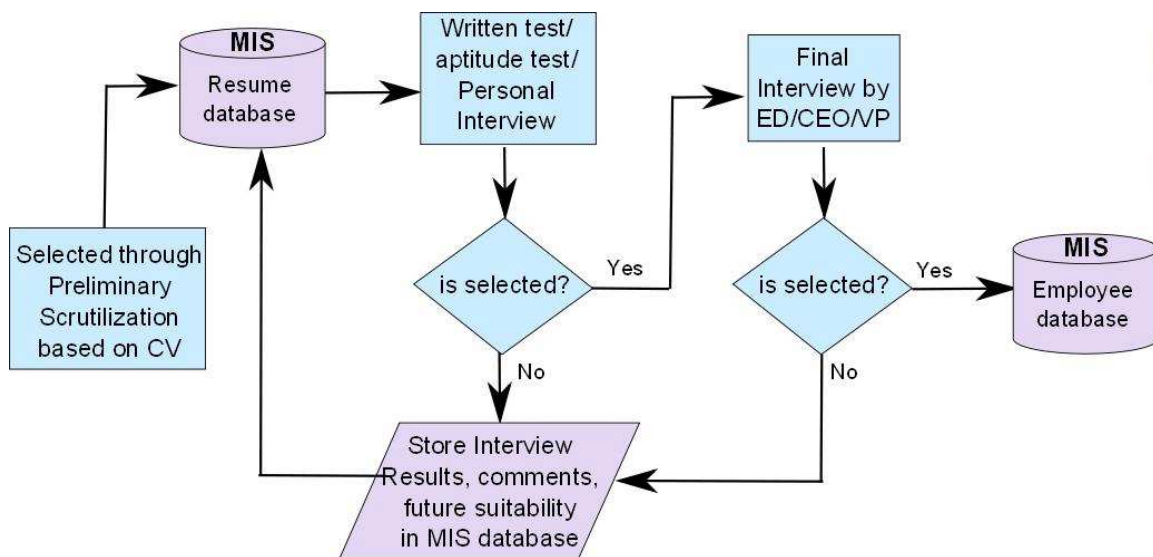
Selection and Recruitement data
to be captured by MIS

As we see above (i) the MIS data does not include all the candidates who have applied for the jobs rather includes only short listed candidates, (ii) it not only includes the candidates past profile but also includes the results of written tests, aptitude tests, preliminary interviews and final interviews, (iii) the selection and recruitment MIS is linked to the employee MIS at the end of the process.

4. Structure of Recruitment MIS Database

The structure of database involves several factors such as "key fields", "indexes", "normalization", "validations", "triggers" etc. For example, while the "key fields" are generally indexed by default other fields are also sometimes indexed to optimize query performance. The logical plan of a database design is useful to guide implementing the functional specifications of the database after it has been implemented. The structure of the database for the selection and recruitment MIS may be as below.

4.1 A model structure of the database

Structure of CandidateMaster Table

Fieldname	Type/ length	Details	Remarks
CandidateId	Numeric/ Autoincremental	Candidate ID	Key field, no duplication
Entrydate	Date	Date of entry	Internal by the system
FirstName	Char 50	First Name of the Candidate	
LastName	Char 50	Last Name	
Address	Memo	Detail address	
PostalCode	Char 20	Postal Code	
Phone1	Char 20	Primary Phone	
Phone2	Char 20	Secondary phone	
Email1	Char 50	Primary email	
Email2	Char 50	Secondary email	
Photo	Picture	Photo of applicant	Store pictures in separate jpg files
Coreskills	Memo	Core skills of the candidate	
Appliedfor	Char 100	Position applied for	Including other positions his profile may be suitable
Education	Memo	All educational qualifications	
Experience	Memo	Experience of the candidate	
Reference	Char 150	If the candidate has given some reference names.	Some organizations ask for reference of some well known personalities to verify the reputation of the candidate.

Profile	Memo	Summarized biodata of the applicant	
InterviewDetails	Memo	Name of the interviewers and their remarks in precise	Will include recommendations if any, successive interviews if any etc.
Confidential	Memo	Confidential remarks	Visible only to ED/ CEO/ VP
Selected	Yes/no	Whether the candidate was selected	
SelectDetails	Char 100	Selected for which position	
Rejected	Yes/no	Whether the candidate is not suitable for future interviews	
RejectDetails	Char 100	Why the person is not suitable	
OtherRemarks	Memo	Any other remark	May be used by HR manager/ MIS admin
Disabled	Yes/no	To be used by the operator	Disabled entries will not be displayed on the reports.

Note: the fields in this MIS database may vary depending on the nature of organization and needs of the management. For example, if there are only a few competitors in a business it may be useful to capture "organizations previously worked", if the salary is a major deciding factor then a separate field may be added showing "salary expectations" etc.
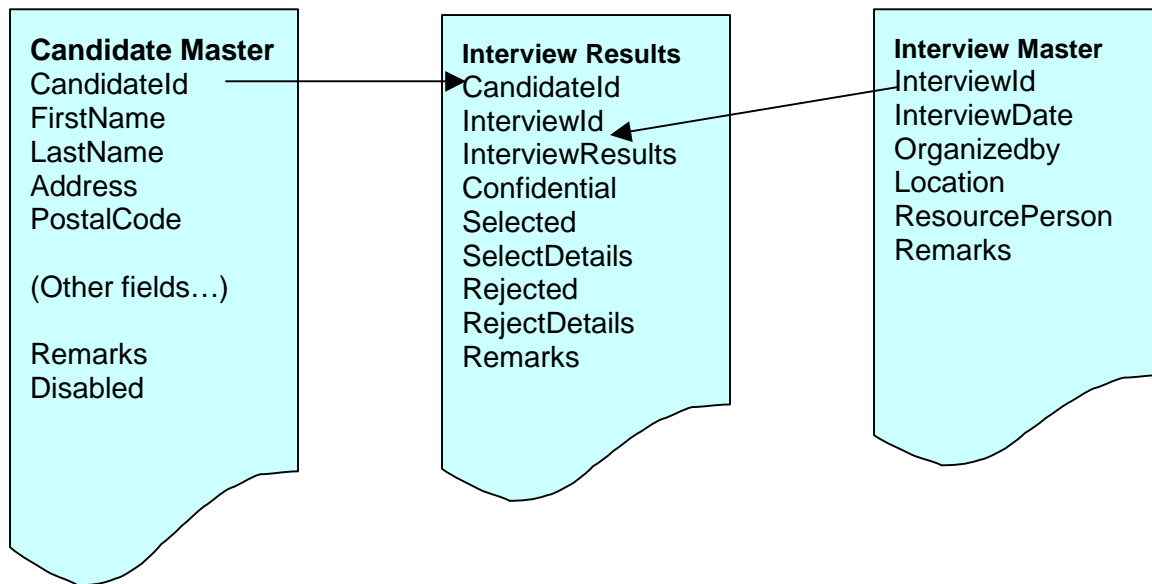
4.2 Data Normalization

Normalization is the process of removing redundancies from the data. When there are many repetitions in a table it is useful to normalize the database by breaking the flat structured tables down to smaller interrelated tables.

There are three popular rules to produce a normalized database. The First Normal Form simply states that no multi-value columns may exist within a table. The Second Normal Form states that non-key columns must be related to all columns that comprise the primary key. The Third Normal Form states that no non-key column can depend on another non-key column.

The first step in creating a successful relational database implementation comes from the creation of a good logical design for the database. This includes designing the tables and defining the relationships between them. For example, in our selection process a candidate may be interviewed more than once. Hence it may be logical to

create a separate "interview master" table and "interview details" table and link them with the candidate master table.

Candidate Master
CandidateId
FirstName
LastName
Address
PostalCode

(Other fields…)

Remarks
Disabled

Interview Results
CandidateId
InterviewId
InterviewResults
Confidential
Selected
SelectDetails
Rejected
RejectDetails
Remarks

Interview Master
InterviewId
InterviewDate
Organizedby
Location
ResourcePerson
Remarks

In the above revised structure the "interview details" of the candidate is separated from the main table to two different tables, viz., "Interview master" and "Interview Results". The interview details like "interview results" etc. are taken out from the "candidate master" table to the "interview results" table.

If a database has a solid design, other performance issues can be resolved even after the database is implemented. But if the database schema is designed poorly, the related performance issues can be addressed only by changing the design of the database which often requires reentering of the data.

However there are exceptions to normalization. If the database is used for decision support then it may be more meaningful to have some redundant entries for increasing the speed of queries. A thumb rule of reasonable normalization allows the queries to join a maximum of four tables. As too many joins can make the queries complicated and affect performance the over normalized tables may be combined back. This process is often called denormalization.

5. Data entry

Data entry although is a responsible job is often found to be boring. Some people like to enter data as that would give them the access to view the data. But when the inquisitiveness is lost they get tired of feeding the data. Let's first analyze the nature of data and then discuss who should enter the data.

5.1 Who should enter the MIS data for selection and recruitment

If we look at the nature of the above data we can see that there are at least two phases in the data entry. One is before the test/interview and another is after the test/interview.

Entering pre-interview data

The pre-interview data basically involves the profile of the candidate including education and experience. The pre-interview data should ideally be entered before the interview. As the Resume before the interview are generally handled by HR manager (or similar) ideally this data should be entered by the same person.

Entering Interview related data

Interview related data includes date of interview, interviewers and interview results etc. This data is generally confidential in nature. Besides it may include other sensitive data such as family details, medical data, salary negotiations etc. Hence this data should be maintained with strict confidentiality.

It is very difficult to answer who should enter this data. Actually it depends on the structure of organization, type of interview and interviewers and other environmental conditions.

⇨ The best solution is that the interviewers will enter the interview results. **Drawback**- there may be multiple interviewers, besides there can be external guest interviewers. **Solution**- however there must be a coordinator representing the organization who can do the entry.

⇨ If the above is not suitable for some reason then the HR manager who handles the interviews can enter the interview results.

5.2 Data validation and data integrity

There is a popular saying "garbage in garbage out". It is important to ensure that the data entered are valid and correct. Various validation routines may be used to ensure the validity of data before they are entered. For example,

⇨ The emails may be validated to check the correctness of the format. (However there is no method to check the email is correct or not.)

⇨ Phone numbers may follow a certain format and may not allow characters.

⇨ Some fields should allow null values (for convenience in data entry) and some fields should not allow null value (to maintain data consistency and usefulness).

⇨ Entity integrity defines a row as a unique entity within a particular table.

⇨ Domain integrity specifies the validity of a specific data entry within a given column.

⇨ Referential integrity is used to preserve a defined relationship between two tables when records are added or deleted. The PRIMARY KEY and FOREIGN KEY constraints can be used together to enforce referential integrity as well as entity and domain integrity.

⇨ User-defined integrity allows the administrator to define additional business rules that do not fall into any of the other integrity categories.

⇨ The table may have UNIQUE constraint to enforce uniqueness on non-primary key columns. The UNIQUE constraint has a function that is similar to that of the PRIMARY KEY constraint, but it can allow null values.

6. Reports on Selection and Recruitment

Now it is the time to see what sort of reports are expected from this HR MIS and who are he potential beneficiaries of these reports. Roughly there can be two types of reports, one is the list of candidates organized and filtered by different conditions, and another is the details of any single candidate.

Report-1: List of Candidates

List of Candidates

Sort by Name of Candidate ⌄ Order Ascending ⌄ Filter Name of Candidate ⌄ = kant [Refresh]

Serial	Candidate Name	Address	Core Skills	Applied for
1	Umakant Mishra	208-A, Prime Classic, Chinappa Garden	Systems Analysis and Design	Database Manager, Systems Analysis, Information Systems Manager

The name of each candidate may have a hyperlink. Clicking on the hyperlink will display the details of that candidate in the format below.

The list of candidates may be sorted by the names of the candidates or on other parameters.

This report may have a filter option to select candidates based on different conditions. The filter options may look for specific key words in "candidate's name", "address", "profile" etc.

Report-2: Details of a particular Candidate

Database of Professionals

Details of : Umakant Mishra

Address:
Chinappa Garden
Bangalore, India
Phone- xxx
email- xxx

Core Skills
Systems Analysis
and Design

Applied for
Database Manager,
Systems Analysis,
Information Systems
Manager

Profile of the Candidate

Education

Experience
Umakant worked for more than 18 years in various fields of Information Technology and served at different capacities in different reputed organizations. He last worked as Chief Technology Officer in CREAX Information Technologies (2000-2004), Bangalore. Before Joining CREAX, he was working as Manager Information Systems and Asia IT Coordinator (1996-2000) in ActionAid. Prior to that he had successfully worked as a Programmer, Senior Programmer, Data Analyst, Senior Systems Analyst and Systems Architect in various reputed

Result of past Interviews

No interview yet..

The results of all past interviews may be displayed chronologically one after the other including written test, aptitude test, group discussions, viva-voce etc.

The report may display the confidential information based on login. For example, if the HR Director or Executive Director or CEO logs in then it will display the confidential information, otherwise not. This field can contain confidential information like personal character, salary negotiations and other such things that may be too sensitive.

7. Administration of recruitment MIS

This MIS is part of the organizational MIS and may be administered by the MIS administer who is typically the IT/IS manager or somebody having similar knowledge/experience in the organization.

⇨ Different levels of management may be given different levels of access to different data in MIS. While more people will have only read access only a few will have write (entry) access. (More about implementing access rights was described in the previous article[3].)

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[3] Umakant Mishra, *How to Implement Access Rights in an MIS Project*, available at http://ssrn.com/abstract=2315570

⇨ As data entry is a responsible job, by default nobody should have access to the data entry screens. The MIS administrator should selectively assign rights to specific people, such as HR Officer/ HR Manager who will be doing this job.

⇨ Visibility of reports- the list of candidates may be visible to multiple managers. But the results of interviews should be restricted only to a few senior managers. The MIS admin may selectively allow or block access rights to different managers as required.

⇨ Confidential comments entered by ED/CEO/VP/similar should be visible only to the people at the same level. Confidential comments may include personal behavior, medical data, salary negotiations etc.

8. Summary and Conclusion

Although selection and recruitment is a key HR function it is often not possible to maintain a large database of all the job applications. However, it is necessary at least to maintain a small database of all the candidates who have been selected for past interviews. This information may be considered as a part of HR MIS and may be maintained by HR department along with other HR MIS such as employee information, transfers, performance appraisals, trainings etc.

This recruitment MIS database includes all the candidates after the preliminary scrutiny is over. When the candidates go through different stages of interviews, the MIS also captures all their interview results. Maintaining this information not only helps the HR manager but also helps other senior managers to find the short listed/ interviewed candidates quickly from the database.

As this MIS data contains confidential information, such as, salary negotiations etc., the access to this data should be restricted only to few senior managers. The MIS administrator may assign read/write access to different data/reports based on the role and responsibility of the manger in the organization.

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About the author

After working for more than 18 years in various fields of IT in different organizations Umakant is currently carrying out independent research on TRIZ and IT since 2004. He last worked as Director and Chief Technology Officer (2000-2004) in CREAX Information Technologies (Bangalore). Before that he worked as IS/IT manager (1996-2000) for ActionAid India (Bangalore).

Umakant is a Master in Philosophy (MA), Master in Business Administration (MBA), Bachelor in Law and Logic (LLB), Microsoft Certified Systems Engineer (MCSE+I), Certified Novel Engineer (CNE), Master Certified Novell Engineer (MCNE), Certified Intranet Manager (CIM), Certified Internet Professional (CIP), Certified Software Test Manager (CSTM) and holds many other global IT certifications.

Umakant has authored the books "TRIZ Principles for Information Technology", "Improving Graphical User Interface using TRIZ", "Using TRIZ for Anti-Virus Development" etc. and working on a book on "Management Information Systems". Many of his articles are available in SSRN eLibrary (http://ssrn.com/author=646786), bepress (http://works.bepress.com/umakant_mishra), Arxiv (http://arxiv.org/a/mishra_u_1) etc. More about Umakant is available at http://umakantm.blogspot.in.