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Modelling analytical HR services

Analytical HRM

Business intelligence and analytics have been one of the hot topics. Scope of BI/BA and their applications are wider. However, most of these applications are more customer and product centric and often more focussed on domains like customer relationship management (CRM). Typical CRM activities are divided into two types: operational and analytical. While organizations are extensively using BI tools and techniques such as data mining for analytical CRM to identify (target), attract, acquire, develop and retain their customers well [1][2], they do not to use the same tools and techniques in other functional areas such as human resource management (HRM) that rigorously. Even most of the personalisation and recommender systems involve and are modelled on two entities or subjects: *consumer* (customer, user etc.) and *item* (product, content etc.) [3].

People in the organization are considered as valuable assets of the organization. They are the back-bone as well as face of the organization. They possess precious tacit knowledge about systems, processes, workflows, culture, experiences of dealing with customers and so on. As customers have issues with the organization so the people working in the organization. They need to be taken care of well in order to achieve higher productivity. Each individual is different. Everyone has his or own educational background, experiences, technical skill-sets, personal agenda, family conditions, temperament and soft-skills. The bottom line is, as the organization has to treat one customer at a time, the organization needs to deal with one employee at a time to offer every employee personalised and unique experiences [4]. For example, offering a *job profile* to the *right employee* (based on his or her experience, skills and various other factors) at the *right place* (e.g. his/her preferred/convenient office location) at *right cost* (e.g. salary he/she deserves) using the *right resources* (e.g. office space, equipments and support staff etc.) [5]. Retention of valuable employees is far more important than retention of customers because a loyal and productive employee can handle many customers well to bring value to the organization. So similar to analytical CRM, there is greater scope for analytical HRM.

Data model for analytical HRM

People, resources (including technology) and processes (services) are three major entities of any organization. Data objects that hold information about these generic entities in HR domain can be modelled using analytical data model (ADM) which is based on five basic entities: *party*, *item*, *transaction*, *time* and *location* discussed in [5] as shown in table I. *Party* entity represents and stores information about individual organization and people. Ideally both organization and people play dual roles: *consumer* as well as *provider*. Employees use organizational resources (so they are consumers of organization's resources and organization is provider of those resources) to render services to organization (so they become provider of services and organization becomes consumer of their services). The services (e.g. job profiles) performed by employees and the resources provided by the organization are represented by generic entity *item*. There are various activities, interactions and operations are performed amongst and by the parties represented using entity *transaction*. Transactions involve various entities: consumer, provider, item, time and location to reflect *who*, *what*, *when*, *how* and *where* etc. Organization and employees have physical addresses, websites, contact mechanisms etc. together modelled by entity *location*. Apart from basic entities, there can be entities that hold meta-knowledge about the basic entities such categories, hierarchies, types, classes, relationships and roles. For example, each job profile

Table I : Generic entities in HR domain [6]

Entity	Sub-type	Examples
Party	Consumer	employee (people within organization, contract workers, prospective employees) organization (employer consuming services rendered by employees)
	Provider	organization (provides resources to the people) employee (provides services to organization)
Item	Service	job: regular job, task, assignment, project, process
	Resource	money, machines, stationary, office space, work place, documents, vehicles, data, information and knowledge
Transaction (activity)		hiring, firing, assigning, evaluating, awarding, assessing, providing feedback and rating, promoting, demoting, suspending, imparting training, getting training, sharing, collaborating, connecting, attending, resigning
Time and location (of resources, parties, activities etc.)	Physical	area, city, state, country
	Online	website, WAP, URL
	Contact	phone no, email, fax
	Mobile	train, flight, bus, ship

can have hierarchy (e.g. top, middle and operational management), category (e.g. technical, scientific and administrative) and type (e.g. supporting, supervisory and managerial).

Process model for analytical HRM

HR processes can be divided into two basic types: purely operational and intelligent (analytical). There are various activities such as targeting and selecting the right individuals, evaluating performance, setting up right targets, assessment, mapping competencies can be called analytical tasks. These can be modelled using service based approach [6]. Figure 1 shows some of the questions that can help to understand what kind of analytical tasks are involved. The role of employer is assumed to be as consumer and people working in organization as provider. These tasks can be implemented using various intelligent, filtering and data mining techniques in same way as that of analytical CRM. For example, service: *personalization* can be implemented using content and demographic filtering to recommend the product(s) to the online user based on his or her past buying/ spending patterns and demographic profile. In HR context, personalization means recommending the most relevant job profile(s) to the employee based on
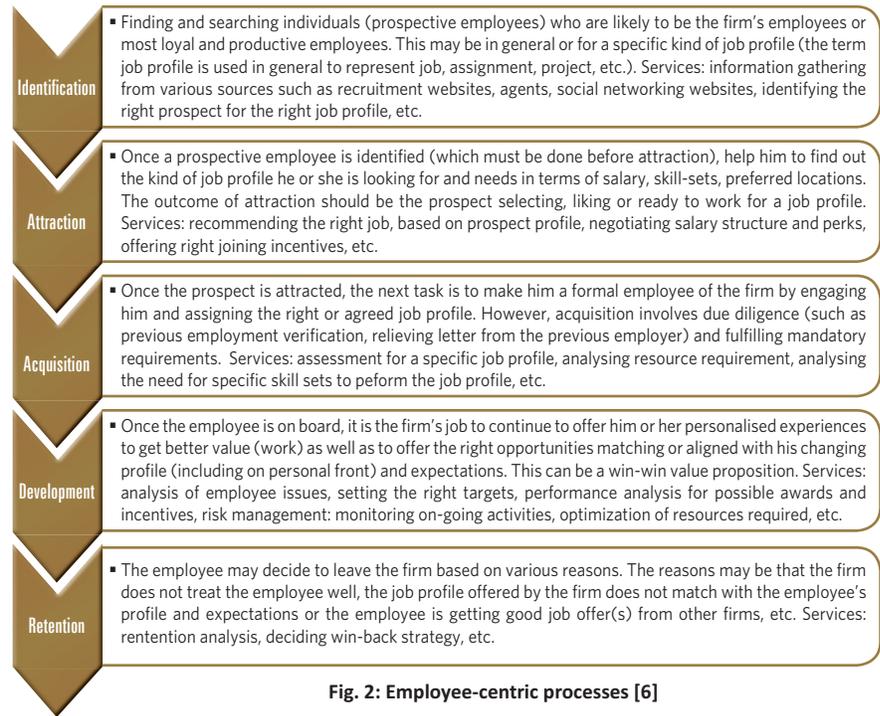
qualification, skill-sets, training acquired, past experiences and demographic characteristics. Similarly, service: *targeting* in CRM is used to select the right customers (may be prospective) for a specific item (product/service). In

Identification	▪ Finding and searching individuals (prospective employees) who are likely to be the firm's employees or most loyal and productive employees. This may be in general or for a specific kind of job profile (the term job profile is used in general to represent job, assignment, project, etc.). Services: information gathering from various sources such as recruitment websites, agents, social networking websites, identifying the right prospect for the right job profile, etc.
Attraction	▪ Once a prospective employee is identified (which must be done before attraction), help him to find out the kind of job profile he or she is looking for and needs in terms of salary, skill-sets, preferred locations. The outcome of attraction should be the prospect selecting, liking or ready to work for a job profile. Services: recommending the right job, based on prospect profile, negotiating salary structure and perks, offering right joining incentives, etc.
Acquisition	▪ Once the prospect is attracted, the next task is to make him a formal employee of the firm by engaging him and assigning the right or agreed job profile. However, acquisition involves due diligence (such as previous employment verification, relieving letter from the previous employer) and fulfilling mandatory requirements. Services: assessment for a specific job profile, analysing resource requirement, analysing the need for specific skill sets to peform the job profile, etc.
Development	▪ Once the employee is on board, it is the firm's job to continue to offer him or her personalised experiences to get better value (work) as well as to offer the right opportunities matching or aligned with his changing profile (including on personal front) and expectations. This can be a win-win value proposition. Services: analysis of employee issues, setting the right targets, performance analysis for possible awards and incentives, risk management: monitoring on-going activities, optimization of resources required, etc.
Retention	▪ The employee may decide to leave the firm based on various reasons. The reasons may be that the firm does not treat the employee well, the job profile offered by the firm does not match with the employee's profile and expectations or the employee is getting good job offer(s) from other firms, etc. Services: rentention analysis, deciding win-back strategy, etc.

Fig. 2: Employee-centric processes [6]

HR context, the service: targeting means selecting the right employees (may be prospective) for a specific item (job profile).

Similar to customer centric processes, the employee centric processes can be divided into five phases: identification, attraction, acquisition, development and retention as shown in figure 2. Each of these can involve analytical tasks as shown in figure 3. For example, service: *targeting (or connecting)* the right prospective employees for a job profile is part of phase: *identification*. These phases can be followed for specific type of job profile. It is possible an employee may not be suitable for a particular job may be *identified* for another kind of job where he or she is better fit and suited.

Support of KM and Web 2.0

People possess tacit knowledge. Organizations have been opting for knowledge-management systems to extract, store and retain valuable tacit knowledge. Apart from using external web 2.0 resources available worldwide, organizations are adopting to web 2.0 (more meaningful, standard, structured and people web) technologies internally to become enterprise 2.0 which facilitate to create, collaborate, share, exchange, search, disseminate, integrate and use
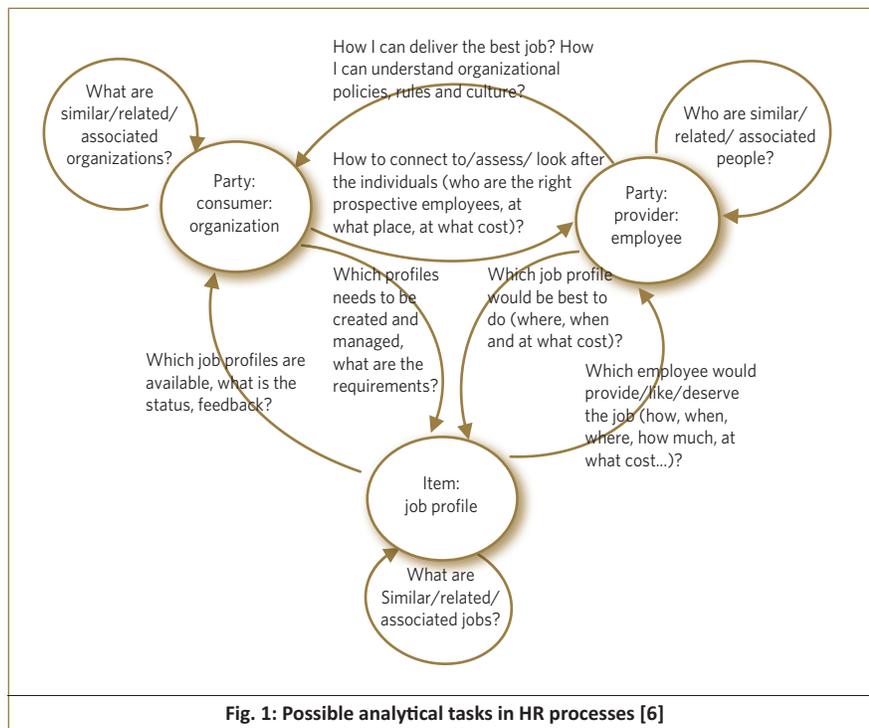
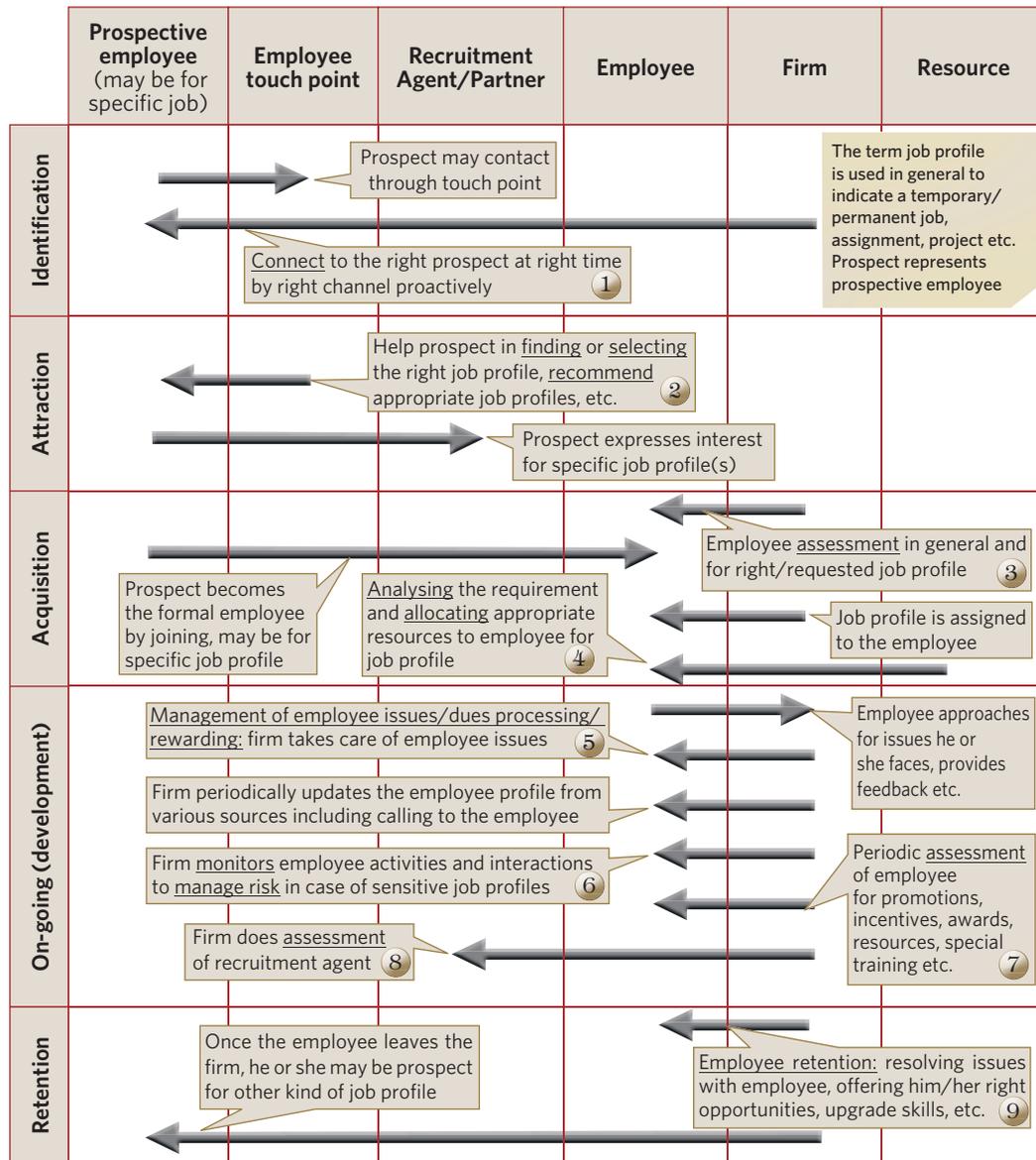**Fig. 1: Possible analytical tasks in HR processes [6]**

Fig. 3 : Example generic employee centric activities/analytical services [6]

information, knowledge and applications across the organization and stakeholders. These involve blogs, wikis, reviews, feedbacks, mashups, social networking and so on. These all provide valuable knowledge and supplement to analytical and collaborative HRM.

References

1. Ngai, E. W. T., Xiu, L., & Chau, D. C. K. (2009). Application of data mining techniques in customer relationship management: A literature review and classification. *Expert Systems with Applications: An International Journal*, 36(2), 2592-2602.

2. Ngai, E. W. T. (2005). Customer relationship management research (1992-2002): An academic literature review and classification, *Marketing Intelligence and Planning*, Vol. 23, 582-605.

3. Adomavicius, G., & Tuzhilin, A. (2005). Toward the next generation of recommender systems: a survey of the state-of-the-art and possible extensions. *IEEE Transactions on Knowledge and Data Engineering*, 17(6), 734-749.

4. Prahalad, C.K., & Krishnan, M.S. (2008). *The new age of innovation: Driving Co-created Value Through Global Networks*, Tata McGraw Hill, New Delhi.

5. Sonar, R.M. (2011). Rethinking Business Intelligence, *Computer Society of India (CSI-C) Communications*, 35(3), June 2011.

6. Sonar, R.M. (2011). *Next Generation Business Intelligence: A knowledge-based approach*, Vikas Publishing House, New Delhi.