Professional Practices (SS4910)

Chapter 8

Human Resource Management and Software Engineering

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- In the broadest sense, human resource management is a managerial campaign that, with difficulty, might be challenged on the grounds that it associates profitability or value for money with social desirability. The Inflexible and procedural elements of human resource management do, but, provide a model framework for the development of sound management practices. That is to say, whatever might be the reality of management practices in industries that are competing by unemployment and justification, its apparent emphasis on the management of people, staff training and development, a strategic approach and the idea of the “learning organization” do suggest that human resource management is particularly appropriate for software work.

8.1 A model of Human Resource Management-salient Features for Software Engineering

- There is broad agreement about what constitutes the straight features of a model human resource management framework. A corresponding commitment to the organization is expected from employees. They are therefore independent in the sense of, to some degree, managing themselves. So a united or unitary viewpoint is suitable because everybody can be relied upon to pull in the same direction, even though individualized for performance evaluation and pay. Human resource management is the responsibility of all managers and combined into line management. Its final generalized feature that is the maximum utilization of human resources available to the enterprise.

8.1.1 Long-term, Strategic and Proactive in Style

- According to Piganiol
- In this new approach, the human factor is clearly included from the very start; job analysis in the broadest sense is one of the bases for scenario-building. The scenario evaluation stage takes account of what the workers will be likely to accept, proposals they might oppose, required periods of notice and the expected training arrangements.
- Human resource planning or what used to be called manpower planning is of great importance for managers responsible for locating and developing resources for the information technology environment. The problems associated with personnel in an information technology environment require a disciplined approach to establishing numbers of staff; the utilization of personnel; the development and education of employees, together with the construction of comprehensive human resource management policies that are not only responsive to Immediate needs but also are building blocks for the medium- and long-term corporate requirements.

8.1.1 Long-term, Strategic and Proactive in Style

- Managers may want to make a projection of future staff needs based on expected demand and output and the necessary inputs of capital and labour. Computerized personnel management systems, including databases of employee characteristics, are a valuable tool for managers in assessing present and future staffing requirements. Such information systems go hand-in-hand with difficult and careful procedures for recruitment, reward and promotion. A key issue for human resource management is skills retaining and development. Although it is a fallacy that planning is impossible when change is rapid and unpredictable, we do need to take seriously the objection to excessive presumed reasonableness and top-down strategy:
- Arguments for the efficacy of formal planning and strategy as a method of ensuring organizational survival and growth rest upon some doubtful assumptions about people's abilities to process information and, in general, to learn from experience

8.1.2 Commitment to the Organization

- The human resource management by making a distinction between control through belief on the rules governing employment and commitment that would come from empowering employees with status and responsibility for quality production. However, Anthony was surely correct to argue that control is an ever-present requirement for management. Consequently, the real challenge is to shift employee attitudes from simple agreement with rules at work to commitment and self-motivation. The new idea of skill is at once less definite and yet more vital, referring “not so much to the technical qualifications of employees but to their qualities in terms of attendance, flexibility, responsibility, discipline, identification with the company and, crucially, work-rate”.

8.1.3 Self-management

- Promoters of human resource management often talk of empowering the employees with responsibility for production quality. Workers are called upon actively to exercise joint “proprietorship” of that small business denoted by their project teams and to participate in the full range of tasks involved in building a perfect product on time. This is far from total self-management, rather a kind of bounded. Team working is a vital element. Bill Gates, among others, has made the point that software is much better done in very small teams. Some products like OS/2 break down to smaller parts that different teams can make but many products cannot be so divided. Direct and regular face-to-face contact between managers and workers is emphasized. As well as improving supervision, this builds trust and helps maintain motivation. This is far from straightforward because performance appraisal, assumed to be central in most human resource management strategies, can have a disastrous effect on team-building.

8.1.4 Unitary Perspective

- In the unitary perspective, the entire initiative is regarded as similar to a team with one focus of loyalty and one focus of authority. Managements in general do not like the trade union preference of the “rate for the job”. However, when it comes to motivation, individualized performance-related pay is very much a double-edged weapon. In fact nearly all studies of motivation, whilst acknowledging that pay is important, controvert the idea that it is an effective motivator.
- In software development particularly, a crucial part of keeping effective workers content is a system where they can be promoted without having to become managers.
- For example;
- At Microsoft a talented software developer can stay just that and yet rise to the top tier of elite “architects”. These architects are not company directors despite their seniority, but report to the chief executive on an easy basis.

8.1.5 Flexible Work Roles

- The human resource management approach tends to criticize bureaucracy; frankly, this is a bit of an Aunt Sally as all organizations are bureaucratic to some degree. All the same, the idea is that rather than the organization being systematic and centralized, with job roles formally defined, the roles are flexible with transfer of decision-making and an organic. According to the American management consultant, Rosabeth Kanter, high-tech firms in particular show four main characteristics affecting their management structure:
- The abovementioned need to motivate and retain technical talent;
- Decentralization / power transfer from centre to lower ;
- Looser authority structures;
- Matrix / medium organization.
- Conventionally, the management at a particular site or establishment is grouped according to staff function (horizontal grouping into production, marketing, accounting etc.) with delegation via line management down to first-line supervision.

8.1.6 Integrated into Line Management

- Rather than the personnel function being specialist and apart, human resource management is visualised as largely integrated into line management, such that all managers are responsible for it.
- Administrative procedures formerly attached to the personnel role were handed over to line management. It has been suggested that such developments are bad news for the future of the personnel management function. Perhaps the worst case scenario is that personnel will remain responsible for collective employment issues (i.e. collective bargaining) and that line managers, together with external consultants, will concentrate on the growing package of measures for the individual employee. Whilst this does not appear to have happened, the degree of integration of any genuinely strategic human resource management into line management has surely been limited in most industries.

8.1.7 Maximum Utilization of Human Resources

- Of course, improving the utilization and cost effectiveness of human resources is important but measuring information technology productivity is far from straightforward. The work processes are complex. Some approaches to measurement may potentially mislead managers so that they fall into the trap of concentrating on the detailed activities, rather than value-added. The following example is from hardware but also applies to software:
- ICL's Ashton-under-Lyne factory invested heavily in training and developing its workforce in order to improve flexibility and in raising standards through empowerment and quality initiatives. This shifted the emphasis from how much an hour workers are paid to how value can be added in each hour that people are employed. The approach has resulted in sharp improvements in quality, cycle time and productivity. From start to finish, a standard PC is built in ten minutes. Employee relations have also improved; labour turnover is only 1 per cent. Building on this, each member of the workforce receives a mandatory eight days of training a year.

- It would be misleading to suggest that such approaches are widespread.
- Typically, British managers do not see their role as being crucial in the training and development of the employees with whom they work. The prime signal managers receive from the top (for example, in the form of appraisal criteria, reward systems and promotion patterns) is that what really counts is delivering short-term results in physical and (especially) financial terms.

8.1.7 Maximum Utilization of Human Resources

- The under-side of human resource management, for which decentralization and empowerment may provide a frontage, is its potential, particularly when combined with information technology, for disturbing observation of employees.
- According to Winfield effective use of human resources now means exactly what it says:
- It is the possibility of computer observation of work rate that allows decision makers to look more critically now than ever before at work output in offices. Simply attending—selling your time—may have been tolerated in the past; what is now possible and indeed demanded by monitoring and control systems is nothing less than effective work. It is nothing short of people's attention and total dedication to the task in hand that is now being asked for.

8.2 The Structure of Software Development and Production

- Software development and production in the sense of manufacturing can be notable. The main business is software development, with mass production of software packages sometimes combined, sometimes sub-contracted. Full-time employees' form the majority of workers in software development and production, the business is so various and fragmented that to speak of an industry is possibly misleading. Many software workers are employed by companies whose software development is definitely additional to their main business. They may not be interested in commercializing their own software in case this diverts from delivering systems for the main business.

- Witham provided a summary of the various categories of non-permanently employed workers. A self-employed worker is one to whom work normally done by a permanent employee is sub-contracted. The self-employed contacts the end-user, arranges the work content and duration, scale of charges and schedule directly, signs a contract directly with the end-user and performs the work either on-site or at base. Self-employed also signifies that the sub-contractor is an individual without partners or employees

8.2 The Structure of Software Development and Production

- Workers earning fees are better than lazy hands. The software house gains a contact and possible future client. Sometimes work for which the software house originally presented has been taken over by the client but the original software project team stays on-site. Witham commented that the better software houses do not like this practice but more greedy outfits that importance to be software houses but are really glorified body-shops, are less difficult.
- Teleworking is simply work by remote control. Usually the worker is working from home and maintaining contact with the employer or, if self-employed, other business, through communications networks. It reduces commuting by making the work flow to and from the worker.

8.3 The Software Factory

- The analogy of software production with industrial scientific management principles goes back to the research of Kraft & Dubnoff. It is a rather different issue to suggest that standardized techniques can be applied to software development, as though it were a type of manufacturing. In general, it is inaccurate to conflate the term software engineering with inflexible division of labour. It is more to do with structured programming, i.e. a logical, structured approach to programming and with software tools to assist productivity. An early definition of software engineering was “the establishment and use of sound engineering principles in order to obtain software that is reliable and works efficiently on real machines”. By setting out the three key elements of methods, tools and procedures, it enabled the manager to control the process of software development. The methods refer to the wide range of tasks in building software—project planning and estimation; system and software requirements analysis; design of data structure; program architecture and algorithm procedure; coding; testing and maintenance.

- The methods often introduce language-oriented notation and criteria for software quality.
- Tools provide automated support for methods. They may be integrated so that the information created by one tool can be used by another, thereby establishing a system for the support of software development (CASE).
- The procedures hold the methods and tools together and control timing by defining a sequence in which the methods will be applied.

8.3 The Software Factory

- However, creating the software that actually does the work is not completely an engineering discipline, even though some software professionals aspire to that. Computer programs are mostly still written the same way they have been for 40 years—by hand— and individual programmers are much more like creative writers than brickies. This is why large-scale government computerization projects are much more likely to go wrong.

8.4 Training and Human Resource Management

Despite universities establishing more IT and computing courses and applications rising strongly, the industry continues to generate more vacancies than capable recruits. Research for Microsoft predicted 1.6 million job vacancies in IT by 2002 when the industry and universities increase training places.

- The perception of IT careers does not help in recruitment. Mark East, education group manager at Microsoft UK was reported in June 1999 as believing that “the view is that most techies are nerds with beards who program all day”.
- It is true that university computer science degrees tend to be pseudo / virtual -scientific and rather theoretical. More traditional courses do emphasize programming and the theory of software engineering. Consequently, students associate computing degrees with science and maths —both areas where applications have fallen over the last decade. By contrast, there are innovative courses aimed at multimedia. Furthermore, from an industry point of view, the mathematically-based computing degree is not always necessary. Business management needs graduates who can work with IT without the theory of computer science. “Research carried out by NOP (No Operation) for Microsoft found that 20 per cent of people entering the IT industry did so without formal IT skills”. Computing companies find that IT graduates often lack transferable or “people-handling” skills, such as communications and a broader knowledge of how businesses work.