Electronic tools for support of Strategic Human Resource Management

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Abstract: The present paper considers the importance of human resources management for the success of organisations in the knowledge society. It provides a short theoretical background on commitment and motivation of employees and the importance of human resource management for meeting organisational goals and achieving its strategy. The deployment of information and communication technologies in this process facilitates the work of managers, as well as provides them with better tools for enhancing employees' participation and involvement in the organisations processes. The paper presents new electronic tools developed as an extension to existing human resources management software, aimed at collecting objective and subjective feedback from employees. An example of the application of these tools is provided and an analysis of the results of the improvement of human resources management in the organisation.

Key-Words: software applications, employees' commitment, motivation, human resources management

1   Introduction

Human resource management (HRM) gains high importance in the knowledge economy as intellectual capital becomes a critical resource and a vehicle for success, competitiveness and growth. Currently the intellectual capital is highly valued and becomes part of the organisation's total market value. As one of the key components of intellectual capital, human capital directly affects the status of the company - its innovation and adaptability, the ability to provide quality end-products or services – bringing competitive benefits and higher revenues [1], [8], [15]. The knowledge, skills and abilities of individuals create value, which is why the focus has to be on the means of attracting, retaining, developing and maintaining the human capital they represent. Therefore, in the heart of every successful corporate strategy is the human capital development and its optimal use for the success and prosperity of organisations [1]. In a learning environment, for example, HRM requires planning and tracking of the professional career of employees and efficient management of knowledge about employees, for better utilization of their competences and experiences [15].

Employees have also an important role for the proper implementation of any new corporate initiative. Organisational culture, leadership, motivation, commitment and participation of employees are often mentioned as critical success factors for change management, quality management, strategy implementation and generally for higher efficiency and performance of organisations [1], [10], [20]. Therefore, organisations put a special emphasis on HRM and the strategy for employment, training and pre-qualification, and motivation of employees. Providing flexible benefits for employees, growing talents, developing strong sense of accountability, as well as building an unique corporate culture are considered as important approaches in HRM [1], [13], [42].

Along with the introduction of various management techniques in organisations, the rapid development of Information and Communication Technologies (ICT) provides enormous opportunities for higher efficiency and performance of company management, and in particular, for HRM [3], [14], [36]. Corporate portals, sophisticated information and expert systems, data bases and business intelligence tools have rapidly changed the business environment and the opportunities for analysis, decision making and

governance [22], [26], [32], [39]. The importance of HRM systems (HRMS) has also grown rapidly in last decades. They have provided opportunities for human resources (HR) specialists to manage complexity, provide fast quality information to decision makers, and have facilitated the adaptability of organisations to the dynamic changes in their environment [22]. At the same time, HRMS have allowed managers to facilitate participation in internal consultancy activities and thus, support better organisational performance [14].

The successful business application of ICTs, and HRMS in particular, strongly depends on their adoption by organisational leaders and employees [36]. Therefore, it is essential to have tools not only to communicate to employees the corporate strategy, goals and tasks, but also to obtain their feedback and ensure interactive communications as a regular practice in corporate management and decision taking. Organisations increasingly pay attention to the assessment of working environment, organisational culture, reasons for leaving of employees, as well as their views on conducted training and company initiatives [6], [8]. Therefore, it is important to obtain objective and subjective feedback from employees and to propose policies for HRM on this base. The final goal is to increase the added-value created by each employee and to reduce the turnover of key staff. Information gathered from employees' surveys can provide insights on work environment, effective job procedures, and potential problem areas. Subsequently, it could be used for changes in operations and the attitude and behaviour of managers, and more generally, bringing competitive advantages to the organisation [6], [28]. At the same time, such module could be especially useful for regular knowledge audit in organisations, thus supporting knowledge management monitoring and control by collecting feedback from employees [10].

This paper extends the work presented at a WSEAS conference [41] and at a conference organised by Sofia University within the FP7 project SISTER [40]. It provides an insight, first, into the importance of HR and its management for achieving strategic goals and objectives, stressing also the need for communication with employees for proper management of the organisation. The theoretical background highlights also possible strategies for employees' commitment, engagement and motivation. It focuses on the importance of employees' feedback for the proper design of the HR strategy and its implementation plans. The influence of ICTs on HRM practice is considered in the third part, as well as different aspects of

technology usage for gaining benefits from knowledge of employees. Finally, the paper presents an example of HRMS - *HeRMeS* and the new electronic tools developed as additional modules to it in order to increase its impact on the organisation's performance. The *Surveys* and *Examination* modules are targeted at obtaining feedback from employees. They are tested in an ICT organisation in Bulgaria, where employees' surveys were never done before [42]. The results of the survey and their analysis are provided here as well.
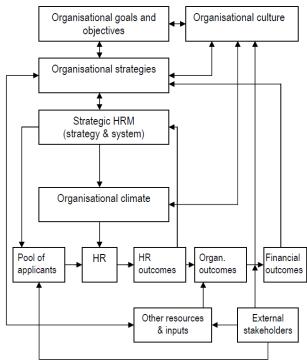
2 Strategic role of Human Resources and their management

In the last century, an unprecedented speed of new knowledge creation was observed, leading to faster innovation, sophistication of products and services and drastic changes in their supply and demand, as well as in all areas of public life [7]. Knowledge in both of its forms – tacit and explicit – has become one of the main factors for sustainable development and competitive advantage, and is applied in all key business processes. Besides, corporate entrepreneurship is considered to rest upon organisational learning through exploration of new knowledge and usage of the existing one [12]. Thus, knowledge is a prerequisite for the development of new products, technologies and services, reaching new customers and maintaining the existing ones. Hence, knowledge determines the market performance of every enterprise [29]. In the present dynamic business environment the ability to improve business performance is a critical requirement for any organisation. Successful organisations are characterized by their strong motivation for the most complete usage of knowledge and their entire worker's intellectual potential. Such approach is realized, inter alia, by incorporating team work and motivating employees to undertake creative and innovative actions [11], [29].

Human resources obviously deserve a special emphasis as people are a driver for creativity and innovation and an essential part of intellectual capital of organisations with their knowledge, experience and skills. Some management theories have especially focused on the company's internal strengths and opportunities as a basis for growth and development. Mocanu et al. [29] consider that knowledge within an organisation is an important asset which can be used as a production input factor, and subsequently can increase the company's competitiveness on the market [29]. The resource-

based view also suggests that the focus on internal organisational resources that are valuable, rare, non-substitutable/inimitable could be a basis for sustainable competitive advantage [24], [45]. This shifts the focus from the external environment and how the organisation positions itself in a competitive market to its internal resources and its ability to use these resources to gain a competitive advantage [9].

More generally, Simpson [34] points out that the organisations' success needs a holistic approach that involves and affects their employees and stakeholders, but also their customers and suppliers and the society in general. Subsequently, excellent results could be achieved through "leadership driving policy and strategy that is derived through people, partnerships and resources, and processes". At the same time, strategy should put together in a coherent framework all organisational processes – focusing on the four perspectives of the Balanced Scorecard Methodology of Kaplan and Norton: Financial, Stakeholders, Internal processes, Learning and Growth [16]. Systematic agreement theory, for example, provides a framework in which organisational alignment (i.e. the degree to which an organisation's design, strategies, and culture are cooperating to achieve the same desired goals) is proposed to enhance organisational effectiveness (i.e. the achievement of organisational goals and objectives) and create competitive advantage [33].

Fig. 1 A framework for strategic HRM [45]

HRM policies, practices and systems constitute an essential element of organisational strategies and effectiveness [9], [24]. In fact, HRM represents 'a strategic and coherent approach to the management of an organisation's most valued assets – the people working there, who individually and collectively contribute to the achievement of its objectives'. It is focused on management of employment, resourcing, learning and development, performance management, reward, and employee relations [1]. As shown on Fig. 1, HRM strategy is an integral part of the organisations' strategy and sets an organisational climate and HRM practice which motivate human resources to contribute (i.e., produce those outcomes) meeting organisational goals and objectives [45].

HRM scholars believe that HRM practices (including recruitment, training, rewarding, performance appraisal, etc.) should build a coherent system, and should complement each other in order to achieve the HRM strategy goals, and subsequently, the stated organisational goals and objectives [9], [24]. In addition, for learning and knowledge-based organisations HRM should support organisational learning through training and development activities, including appropriate career planning and performance appraisal [19].

Storey [38] considers that HRM can be regarded as a 'set of interrelated policies with an ideological and philosophical underpinning'. He suggests four aspects of HRM:

- specific constellation of beliefs and assumptions;
- strategic thrust informing decisions about people management;
- central involvement of line managers;
- reliance upon a set of 'levers' to shape the employment relationship.

The greatest challenge organisations face is adjusting to the non-stop changes. They must be able to 'learn rapidly and continuously, and take on new strategic imperatives faster and more comfortably' [1]. When managing changes it is important to focus on HRM issues in the organisation as HRM engenders an organisational culture (i.e., those shared perceptions of beliefs and values central to the organisation's internal and external stakeholders) that supports organisational strategies and the achievement of organisational goals and objectives. HR managers are in a good position to understand possible resistance to change among employees and they can help to facilitate the necessary information flow and understanding that will help to overcome that resistance [1].

In more recent management practice of change management a special case constitutes the introduction of Knowledge Management (KM). Here, the proper HRM is a key for success as employees have an essential role not only in KM adoption, but also in the phase of analysis of the knowledge state-of-the-art in the organisation and the consequent KM planning activities [41]. Before launching KM, the organisational culture, the knowledge and expertise availability and flows, should be investigated both in the organisation's internal and external environment, and all possible knowledge gaps for reaching corporate goals should be identified [46]. The impact of HRM on organisational effectiveness in this case, but also generally, is mediated by HR performance (including leadership involvement, employees motivation and commitment) that facilitates the achievement of those organisational, financial, and capital market outcomes necessary for the organisation to meet its goals and objectives [45]. Thus, the strategic management approach requires that HRM is consistent with other key organisational processes, and supports the decision making process and taking strategic choices.

The proper HR policy has a direct impact on product or service quality, the market position, labour efficiency, production cost, etc. [40]. Experience shows that organisations implementing commitment and motivation strategies are more successful. Thereafter, the result for the organisation from strategic HRM could be seen in 3 different perspectives [42]:

- *Financial benefits* – the best employers exceed their competitors by turnover, profits and dividends growth.
- *Attraction and keeping of talents* – the best employers have more job candidates and higher level of employees' retention, which leads to higher productivity and knowledge preservation in the organisation.
- *Commitment of employees* – the best employers have enthusiastic and motivated employees, reflecting upon organisation's success.

3 Commitment, engagement and motivation of employees

Finding methods for motivation and commitment of employees is one of the fundamental HRM challenges, especially in the time of rapid progress, changes and pressures to achieve better productivity and performance. Research shows that employees whose needs are satisfied, and who feel higher autonomy are more engaged in their work, perform more effectively, and experience greater psychological adjustment and well-being [27]. The availability of strongly committed workforce is bringing substantial benefits to their organisations. It is a sound base for effective performance, but also reduces turnover and burnout of employees [9], [24], [34]. This is especially important for knowledge workers, who present unique challenges for their employers, partly because of their own unique nature - strong achievement orientation, willingness to take risks, tolerance for ambiguity, relatively weak loyalty to the employer and high identification with the profession [25].

3.1. Main concepts

Various scholars in the last decades have considered different aspects of commitment, engagement, involvement and motivation of employees [2], [27], [34], [44]. Hallberg et al. [44] emphasized that 'work engagement, job involvement, and organisational commitment are empirically distinct constructs and, thus, reflect different aspects of work attachment'. Armstrong [1] considers that commitment and engagement are closely related concepts; however, he distinguishes between commitment to the organization (organizational commitment) and commitment to the job (job engagement). He stresses that job engagement can exist even when individuals are not committed to the organisation. For example, knowledge workers could be more exited with their work, and thus, committed to their job rather than to the organization that provides that work. Engagement is generally caracterised as a 'state of emotional and intellectual commitment' and ensuring job engagement requires the provision of [1]:

- interest and challenge – the degree to which the work is interesting and creates demanding goals;
- variety – the extent to which the activities in the job call for a selection of skills and abilities;
- autonomy – the freedom and independence of the job holder;
- task identity – the degree to which the job requires completion of a whole piece of work;
- task significance – the extent to which the job contributes to a significant end result.

Porter et al. [31], consider that commitment refers to attachment and loyalty, while Armstrong [1] defines organisational commitment as 'the relative strength of the individual's identification with, and involvement in, a particular organisation'. Commitment consists of three factors [1]:

- strong desire to remain a member of the organisation;
- strong belief in, and acceptance of, the values and goals of the organisation;
- readiness to exert considerable effort on behalf of the organisation.

More generally, Meyer et al. [27] define commitment as 'a force that binds an individual to a target (social or non-social) and to a course of action of relevance to that target'. It could be experienced in different ways: affective attachment and involvement with the target (affective commitment), obligation to the target (normative commitment), and awareness of the costs of breaking the involvement with the target (continuance commitment). Commitment is linked not only to an organisation (employer or a union), but could be also related to people (leaders and teams), and actions (goals, programmes) [27]. For organisational settings, Meyer et al. [27] propose a model linking motivation and commitment of employees (Fig. 2).
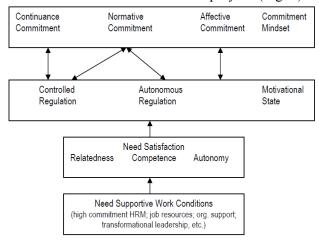

Fig. 2 Model for commitment of employees [27]

A high level of motivation is very important for achieving a high level of commitment and engagement. Generally, motivation is defined as 'the force that energizes behaviour, gives direction to behaviour, and underlies the tendency to persist' [2]. Different factors are considered important for motivation – linked, first, to individual needs, satisfaction and forces driving personal behaviour, second, related to working environment, nature of work, organisational culture, management style, and more broadly, depending on the general environment – economic conditions of the country, culture and other social parameters [2].

One of the most popular motivation models is the needs model of Maslow [23]. He believes that the content of motivation consists of needs, and the unsatisfied needs create tension and a state of disequilibrium, which motivates the behaviour of

people and their actions towards satisfaction of these needs and achievement of the selected goals. According to Maslow [23] all personal needs are in a hierarchy which consists of five major categories starting from the fundamental physiological needs, followed by safety, social and esteem needs, and on the top the need for self-fulfilment.

Meyer et al. [27] point out that at the heart of motivation are three psychological needs: autonomy, competence, and relatedness:

- 'The need for autonomy is satisfied when, at the deepest levels of reflection, individuals believe that what they are doing is freely chosen and consistent with their core values.
- The need for competence is satisfied when people believe they have the capability and resources needed to accomplish their tasks and achieve their objectives.
- The need for relatedness is satisfied when they feel valued and appreciated by others.'

In research, two types of motivation are also discussed: intrinsic motivation linked to enjoyment of the task itself, and extrinsic motivation focused on desire to attain contingent outcomes [27]. Lawler [18] considers the following characteristics as requirement in jobs for intrinsic motivation:

- *Feedback* – individuals must receive meaningful feedback about their performance, preferably by evaluating their own performance and defining the feedback.
- *Use of abilities* – the job must be perceived by individuals as requiring them to use abilities they value in order to perform the job effectively.
- *Self-control* – individuals must feel that they have a high degree of self-control over setting their own goals and over defining the paths to them.

Very important part of programs for HR motivation is focused on creating employees' sense of self-confidence for taking individual decisions and making the first steps in innovations, as well as of having enough knowledge and information for achieving good results in professional aspect. Another aspect is to ensure that every person is treated with respect, and of course good rewards for well-done job are in place [42]. Subsequently, enhancing job engagement starts with job design and focuses on the provision to employees of interest and challenge, variety, autonomy, task identity and task significance [1]. Therefore, the awareness of the needs of employees and satisfying them could be an important step to commit workers fully with organisational goals. Therefore, a work environment should be build such that it motivates employees and provides them opportunities for

establishing close relations with colleagues, managers and the organisation as a whole. The flexibility, change and continuous improvement should be at the centre of HRM for ensuring engagement and motivation of employees. Generally, a win-win situation should be sought: satisfying employees' needs for bringing benefits through their commitment to the organisation [27].

3.2. Approaches for commitment and motivation of employees

There is no universal formula that specifies how to create organisational commitment, job engagement and motivation of employees. Some good practices could be pointed out that affect the level of engagement of employees. Generally, the approaches can be divided into the following categories [42]:

•   approaches related to organisational culture and leadership;

•   approaches related to personal development of each employee;

•   approaches concerning salary and financial rewards.

The first category is characterised by application at organisational level, while the second category is concerned with individuals, and can be applied to a specific employee. It is important to have clear criteria for choosing employees, in case that these approaches will be applied for the whole organisation. With regard to salary and financial rewards, the approaches can be applied either to the entire company or to a specific department [40].

Several methods could be found in practice aimed at proper HRM and in particular motivation and commitment of employees as given below [42].

3.2.1. Inspired Leadership

Managers and team leaders in companies, recognized as good employers, realize that people are their most important resource. They assess that the close communication with employees gives opportunity to understand better employees' needs and this leads to easily identifying personal motivators. According to Hewitt [13], the following actions are critical:

•   *Breaking the distance between managers and employees* – through regular meetings of the management with employees.

•   *Ensuring clear vision and focus* – about the actual situation in the organisation, its business strategy and objectives.

•   *Encouraging transparency and initiative* – through corporate culture based on transparency and consultations in the decision making process and priorities setting.

This is a management model which ensures retention of highly-skilled employees. As a side effect often displays higher innovativeness through sharing of knowledge and ideas, which is typical for learning organisations with specific organisational culture targeted at innovation and new knowledge creation.

3.2.2. Unique Corporate Culture

The organisational culture is reflected in company philosophy and vision, management style, and its physical organisational structures. It includes norms, values, beliefs and ways of behaviour that characterize the manner in which groups and individuals work together [1]. Every organisation has its own unique culture which in most cases is based on the values of the top management or the founders. Over time, individuals attempt to change the culture of their organisations to fit to their own preferences or the changing market conditions. This culture then influences the decision-making processes and management styles.

According to a survey [13] companies with adaptive corporate culture have at least 2 times higher performance and financial results then their competitors. To achieve such results, the company must identify its current organisational culture, determine what it should be and take appropriate actions to adopt the desired culture. Each organisation has its unique corporate culture which could be built and preserved applying the following practices [13]:

•   *Job-Person Fit* – The employment is made following the rule 'Right-Fit', e.g. the personal values and characteristics of employees fully correspond to corporate values. An advantage of this approach is that employees are easily integrated into the organisation and not eager to leave.

•   *Homegrown Talents* – Some organisations prefer to "grow" their leaders on their own using specific programmes for leadership development in synergy with the corporate culture.

•   *Celebration Culture* – Celebrating various events and successes, as well as expressing gratitude to employees' contribution is characteristic for some well-performing organisations.

3.2.3. Strong Sense of Accountability

Successful companies demonstrate their respect to their employees using the sense of accountability for results and recognizing employees' achievements.

They have well-developed policies for productivity management, which strengthen collaboration among employees and the company performance. The approaches presented below support the practice for building strong sense of accountability [1]:

- *Clear communication of expectations* – The permanent communication of organisational goals and development directions from leaders to employees is a base for building better focus and accountability of the latter, and allow every employee to clearly understand its tasks and their relation to the business processes.

- *Strategy for implementation management* – The implementation management is a process which ensures the effective personnel and teams' management with the objective to attain high performance level for the organisation as a whole.

- *Fair rewarding* – Different communication means are utilized (direct communication, focus groups, discussions, etc.) in order to inform better employees for rewarding criteria such as productivity, team work, initiativeness, etc.

- *Rewarding according efficiency* – A good practice is to reward initiativeness, as well as not to use fixed rewards, but to vary them according to the results of each employee as well as to provide different compensation schemes, and options for acquiring shares in the organisation.

3.2.4. Effective Change Management
Each company is changing more or less over time. Different factors could cause a change – external (market trends changes, economic and policy changes, legal changes, etc.) and internal (change of business strategy, technology changes, acquisitions and mergers, etc,). The changes usually create additional stress and tension in companies, so as their proper implementation is critical to maintain satisfaction and motivation of employees.

Although each change is unique, there are common approaches which are better to be respected in order to make the change possible and painless, and to maintain the engagement of employees [13]:

- *Effective leadership* - there are many styles of management (command, consultative, collaborative, etc), each of which is appropriate in certain situations. The command style turned to be appropriate by large organisational changes, for example.

- *Appropriate and timely training* - it is considered to be the most important factor for successful implementation of change.

- *Two-ways communication* with employees and their active participation in implementing the change helps to eliminate the resistance to changes.

3.2.5. Aligned HR Practices
According to survey data [13], 80% of employees in the best European companies claim that the policies for HRM of their companies are consistent with business strategy and expectations for achieving business goals. By comparison, in other companies only 49% of employees think so.

An example of purposeful practice for HRM is the working flexibility. Flexible working time and remote access to company resources are effective tools that help employees to find work-life balance, the balance between the sense of involvement and engagement and the sense of personal freedom. Similarly, the communication strategy is a valuable tool, which is targeted at clarification of corporate mission, strategy, objectives and processes, and motivates employees to remain and engage better in all organisational processes [1].

Contemporary organisations apply different means, especially ICTs, for transmitting messages to their employees [42]. However, besides „top-down" communication from leaders to employees, the good employers create also programmes for feedback from employees and regularly carry out surveys among them on different management and business issues or create specific focus groups. The „bottom-up" communication channels clarify for the leaders the situation in their organisation at lower levels, and provide them with an insight into challenges and problems and the achievements of employees.

3.2.6. Growing Talent
Good employers offer to their employees more opportunities for personal and professional growth. They notice the talented workers and provide them with enhanced training and career advancement opportunities. In such organisations the practice to devote more time and funds for actively developing higher potential and offering alternatives for career progress is established. The focus on growing talents is practically realised by the following approaches [42]:

- *Active training* – putting in place more training channels and programmes, appointing more employees on temporary positions in order to gain new experience.

- *Ensuring solid information channels* – There is a need for career development programmes available to employees and mentorship plans.

One of the strategies for growing talents is job rotation. This is also a strategy to keep the interest

of employees after they show lack of interest in their tasks. Subsequently, the rotation provides new challenges for employees and keeps them in the organisation. At the same time, the rotation programme is a tool for developing broader skills and interdisciplinary knowledge of employees.

3.2.7. Flexible Benefits
Flexible benefits plan is a formalized system that allows variation in the way of payment in order to fully meet the needs of employees. It provides them with a degree of choice on what benefits they want, according to their needs. However, the practice shows that often these schemes are avoided due to the higher costs of their introduction and administration. A study of British Institute of Personnel and Development shows that just over 10% of employers use such plan [4]. These are mainly private companies with more than 5000 employees. In most cases the employees could keep their current payment and vary the level of non-financial compensations or to vary the payment level by reducing the non-financial benefits [42].

3.3.   Rewarding of employees
The motivation and retention of employees is closely linked to the existing rewarding strategy of the organisation. Rewards consist of everything that employees value in the employment relationship, and include both the traditional financial rewards such as salary, incentive pay, stock options and benefits, but also non-financial rewards such as training opportunities, challenging work, and work arrangements that support effective work/life integration. Scholars have discussed different classifications of rewards, but some of the most commonly used categories include monetary/non-monetary, intrinsic/extrinsic, collective/individual, fixed/variable [5]. Medcof et al. [25] consider four categories of Total Rewards (Table 1). It should be, however, taken into account that some of these categories are very important for one group of workers, but make no sense for other. For example, the learning and development category is essential for knowledge workers, but for others payment has higher importance.

   The reward policy could cover [1]:
- providing an equitable pay system;
- equal pay for work of equal value;
- paying for performance, competence, skill or contribution;
- sharing in the success of the organization (gain sharing or profit sharing);

- relationship between levels of pay in the organization and market rates;
- provision of employee benefits, including flexible benefits if appropriate;
- importance attached to non-financial rewards resulting from recognition, accomplishment, autonomy, and the opportunity to develop.

   An important task of HRM is to determine rewards which could encourage employees to perform better in achieving the organisation's mission. Therefore, it is essential to understand what employees really want and determine rewards to optimally meet the needs of both the organisation and its human resources. In this case, a system for obtaining feedback from employees and gathering their opinions and needs is an appropriate tool. At the same time, a key component of HRM strategy should be to effectively communicate to employees all the rewards they receive for their work, including both financial and non-financial ones. Having a well articulated employee value proposition can enable more effective recruitment and retention of the most valuable workers. At the same time, it should be stressed that there is no "one best way" to conceptualise and implement rewards, and that each organisation has its specificity and should develop its own solution for the whole organisation and the different categories of employees [25].

Table 1 Four categories of Total Rewards [25]

Pay	Benefits
1. Base salary 2. Variable pay 3. Stock 4. Recognition programs	1. Health care 2. Retirement 3. Savings 4. Time off
Learning and Development	**Work Environment**
1. Career development 2. Learning experiences 3. Performance management 4. Training 5. Coaching and mentoring.	1. Organisation climate 2. Leadership 3. Performance support 4. Work/life balance 5. Challenge of the work 6. Reputation of the organisation 7. Co-worker relationships

4   Technology use in HRM
Globalisation, deregulation, innovation enabled by ICTs are widely accepted as the key forces driving the economy and society today. ICTs have fully changed the way of working, doing business, living and entertaining. In the business world they brought

dramatic changes in the structure and operation of organisations [36]. Their wide adoption in support of management and business processes has contributed to better coordination and control of organisations, has increased performance, collaboration and knowledge sharing among employees. The adoption of ICTs in organisations followed several phases – starting from single database and going through information systems to more sophisticated systems for decision support, business intelligence (BI) and knowledge management [22], [32], [35]. Nowadays, several management information systems are available on the market supporting the different functional areas (sales, marketing, production, supply, accountancy and finance, HR, etc.) and management levels of organisations (operational, middle and top management) [3]. BI is currently one of the fastest developing directions in information technology. BI systems are connected with CRM systems (Customer Relationships Management) and ERP (Enterprise Resource Planning) to provide an enterprise with a huge competitive advantage [15].

Technology utilisation for HRM purposes could be traced back to the 1960s when employee data were first automated, followed shortly by utilisation of transaction processing systems for administering payrolls and benefits [22]. At the beginning, unsophisticated ICT tools dominated in HRM like spreadsheet analysis, word processing and database management. However, with the advancement of ICTs absorption in organisations, there was a clear change also in HRM practices and technology use.

Table 2 Categories of HRMS use (adapted from [14])

Categories of HRMS use	Previous non-strategic HRMS use	Current strategic use
HR Planning	Succession planning; relocation; HR planning; labour turnover; HR budgeting; wage modelling	HR planning; organisational development; organisational design; strategic planning
Salary Advice	Performance appraisal; wage modelling	Compensation
Employment Benefits	Pensions; car schemes; health schemes	Benefits
Industrial Relations	None	Union Relations
Assessment and Training Needs	Training; management development; performance appraisal, needs analysis; skills monitoring; training evaluation; skills matching	Performance appraisal; competency/talent assessment; employee training/education; management development
Recruitment	Recruitment, budget control	Recruitment; selection
Performance Management	Performance appraisal	Performance appraisal, competency/talent assessment

Presently, HRM systems facilitate the provision of quality information to decision makers, ensure cost-efficiency management, and are crucial for learning organisations where HR provide many benefits [8], [14], [22]. The increased use of ICTs facilitates the work of HR professionals and increases significantly their performance and participation in internal consultancy activities [43]. Here, HRMS take a special place providing opportunity to extract timely, accurate and relevant information from growing data sets about employees, their working environment, performance and satisfaction, etc.

,In the last few years was observed a change in HRMS resulting form the shift in HRM from a focus on staff management to creating strategic contributions [20]. A recent research on HRMS outlines their main usage categories in the past and in the present (Table 2), when the role of HRM is recognized in strategic management and decision taking of organisations [14].
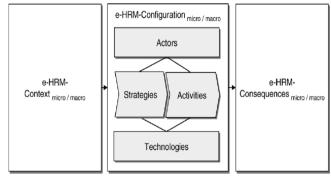

Fig. 3 e-HRM framework [39]

In the world of Internet, virtual and e-HRM tools have developed rapidly, replacing step-by-step the older generations HRMS [21], [37], [39]. They allow individuals to apply for jobs, change their job-related benefits, and enhance their knowledge, skills, and competencies using web-based systems. A definition for e-HRM suggests that ICTs are applied for networking of 'at least two individual or collective actors in their shared performing of HR activities' [39]. Technology serves for connecting spatially segregated users and allows interactions between them, yet it could also serve as a task fulfilment tool. Strohmeier [39] proposes a framework for e-HRM in an organisation (Fig. 3). He considers that it is a multilevel phenomenon by its nature, and both micro (individual) and macro (organisational) levels should be taken into account. Obviously, HRM implementation and its subsequent results (consequences) are closely linked with and dependent on the conditions and environment (context) in which the respective HR activities are carried out. Technology is an enabling factor for e-

HRM supporting HRM strategy implementation and the respective HRM activities. Essential elements of this framework are the actors – individuals at micro level, and groups, organisational units or the whole organisation at macro level [39].

The development of knowledge-based systems (KBS) and BI tools nowadays offer many opportunities also for HRM. These tools could be potentially used for training and development of employees, job analysis, performance appraisal, as well as in personnel administration, selection and compensation where as shown in Table 3 they offer many benefits [22].

Table 3 Knowledge-based systems in HRM [22]

Activity	Role for KBS	Benefits
Human resource planning	Analysis of manpower demand and supply	• Improves labour productivity • Enables quick identification of surpluses or shortages • Creates employee work schedules
Recruitment and selection	Processing of job applicant resumes	• Improves labour productivity • Reduces cycle time • Potential to reduce labour costs
Staff development	Assessment of managerial style	• Provides a formative tool to promote self-analysis • Creates an individual 'blueprint' for development activities
Performance appraisal	Framework for periodic assessment of junior staff	• Encourages use of explicit criteria • Increases assessment consistency
Regulatory compliance	Advice on occupational health and safety issues	• Provides continuous, expert-level safety information
Benefits administration	Auditing and adjudication of benefit claims	• Increases standardization of the review process • Improves prospects of detecting fraudulent claims • Reduced need to access remote databases

As stressed above, HRM should ensure regular employees' feedback and involve them in a permanent communication for organisations' development and strategic planning purposes. Integrating such function in HRMS will help HRM to fulfil its strategic goals much better.

Unfortunately, in most cases the ICT tools used by HR specialists do not include modules for surveys of employees. Traditionally, they are composed of modules for HR planning, salary advising, benefits administration, industrial relations, assessment and training needs, recruitment and performance management [36], [22]. However, conducting regular surveys among employees could be an essential tool for taking decisions by involving the organisation's staff. In the time of ICTs, it makes no sense using the traditional e-mail or paper-based surveys, when e-tools offer many benefits like lower costs, broader distribution, improved accuracy of data, faster survey turnaround times, faster processing of results, greater flexibility in data analysis and reporting, etc. [22], [17]. Therefore, it is essential the creation of survey modules, if not available, and integrating them to the HRMS [42]. This could also support knowledge management practice providing opportunities for faster identification and analysis of available knowledge, skills and competences in the organisation or their possible gaps [41].

At the same time, one of the main challenges for HRM is to find methods for motivation and creation of engagement and commitment of employees in order to achieve better productivity and performance [1]. Therefore, the awareness of the needs of employees and satisfying them could be an important step to engage workers fully for achievement of the organisations' goals. HRM should help in encouraging behaviour that supports corporate strategy.
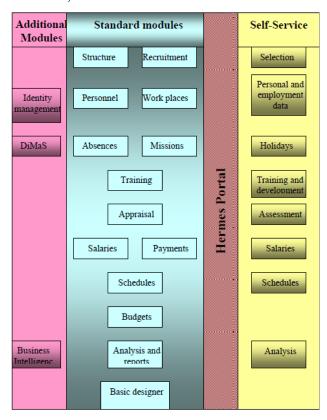
As KM has gained importance in corporate practice in the last decades, HRMS equipped with e-tools for obtaining feedback from employees could facilitate the strategic analysis needed for KM planning and implementation by ensuring the necessary information for Knowledge Assets mapping and Intellectual Capital (IC) Inventorying, Knowledge Landscape Mapping, Creating Knowledge Maps and Knowledge Flowcharts, Critical Knowledge Function Analysis, etc. [46]. Of course, a single survey is not enough for full Knowledge Diagnostics and determining all knowledge-related strengths, weaknesses, opportunities, threats, and risks. However, this is the first step, and HRM plays an essential role in this process. Equipped with powerful technologies, HR specialists could provide high value for corporate strategic analysis, and support organisational activities for planning, action, and regular monitoring of the strategy implementation.

5. E-tools for employees' feedback

HeRMeS is a software product specialized in ensuring HRM activities, and it has been used since 1996. *HeRMeS V* is the newest version which is conceptually different from the previous ones. *HeRMeS V* is on the market from more than two years and it evolves by adding new features. It is a flexible system that is easily adaptive to the

organisation's culture and needs. It is designed on a modular principle and provides services for various HR activities [42]. The interface of the system is user-friendly and the forms are unified. The main modules of the system are divided into three groups (Fig. 4) [41]:

• *Standard modules* – serve the operating HRM activities and are designed for usage by HR specialists. Personal and Structure are basic modules, which keep up-to-date information for employees and the organisation structure. These modules are accessible through desktop application.

• *Additional modules* – provide links to other systems and generalized information for the business. The system could exist and function normally without these modules. These modules are accessible through a desktop application.

• *Self-Services* – is a web-based module for use of all employees. It supports operational tasks which do not require HR specialists' involvement. For example, through Self-Service the employees launch a process for approval of absences or requests for vacancies, etc.

Fig. 4 Modules in *HeRMeS V*

All of these modules are accessible by employees. However, some processes require also provision of access to external for the organisation people, e.g. in the process of job application. Therefore, a *HeRMeS*

V portal is designed to serve these cases and to unify all HR activities linked to external people.

5.1 Surveys Module

The newly designed *Surveys* module is targeted at supporting the investigation of employees' opinion, e.g. after a training course, before leaving the organisations, etc. At the same time, it provides opportunity for larger surveys among employees and getting their feedback on the organisation's health and possible problems, as well as identifying their engagement and commitment status. Therefore, in order to ensure all necessary functionalities of the *Surveys* module by its design, different use scenarios based on the various possible users' roles and actions are considered. Several use cases are determined targeted at [42]:

• *HR specialists:* Survey generation, Definition of group of answers, Individual questionnaires, Leaving survey (Exit interview), Linking survey with personnel list, Linking survey with leaving employee, Group generation of individual questionnaires, Generation of rules, etc.

• *Employees:* Filling-in questionnaires though Self Service, Filling-in leaving survey (exit interview) through Self Service, etc.

The requirements and preconditions for the module are considered on this base, and it is developed to support three main working processes [42]:

1. Design of survey and determining analysis rules and people who will be involved as respondents
2. Filling-in the questionnaire by employees
3. Analysis of survey results

HR specialists have the main role in the first and last processes. They design not only the questionnaire, but also the analysis procedure and links between question, block of questions and the whole questionnaire. Thus, employees, determined to take part in the survey, fill-in the questionnaire by using *Self-Service*. The responses are stored in a database. The analysis results could be provided in different formats – MS Word, MS Excel or Adobe Acrobat. MS Excel is mainly used for a generalized analysis in order to, later, enable the processing of data according to the specific survey rules.

Due to the variety of surveys, the design of the module provides for the use of rules - part of the standard functionality of *HeRMeS V*, which allows the code of function to be manipulated and the function to be called according to specification. This ensures alternative calculation according to the survey-associated rules. Without these rules only the standard reporting is accessible, but if no one of the

standard designed rules applies to the business needs, fast and easy a new rules could be created. The main idea is to create a database of rules by developing step-by-step rules. This will ensure that only the needed rules are developed.

The module is a valuable tool for internal surveys within the organisation and for obtaining reliable feedback for improvement of the management processes. This e-tool provides managers with the opportunity to design surveys according to their needs, using both closed and open questions, multiple choice, ranking, etc.

5.2 Examination Module

The *Examination* Module is aimed at ensuring new functionality of the system *HeRMeS* for support of HRM, for testing of knowledge and skills of employees during their recruitment process, after training, as well as for finding talents. The Module aims at ensuring transparency and standardisation of the examination process, as well as to facilitate the HR managers work through automatisation of the processes for test creation, evaluation and inquiries preparation.

Taking into account the main goal of the module, the following main users are identified [42]:

- *User with administrative functions* – having access to the functions for test generation, examinations definition, participants' registration, generation of inquiries and generalized results.
- *Users evaluating participants* – having access to functions for evaluation of open-ended questions, and opportunity for introducing comments and evaluation of the participants' replies.
- *Examined users* – having access to functions for examination, and for replying to questions, browsing through questions and examination results.

On the basis of analysis of use cases, the following requirements for the *Examination* module were defined [42]:

- The variety of possible tests requires an option for definition of different types of questions.
- The impartial evaluation requires an opportunity for test generation on basis of the selected criteria. This will allow each participant to fill in a different test defined by the system, and not by its administrator.
- An interface for the participants is needed in order to fill in their tests.
- Various evaluation options should be ensured for the actual filled-in test – through different evaluation systems and rules.

- The evaluating commission needs an interface in the case of tests, allowing open-ended questions.
- Integration with the *Recruitment* Module is necessary in order to easily compare the candidates for the same job vacancy.

Taking into account these requirements, access to *HeRMeS V* is granted only to users with administrative functions. The rest of the users access the resources through a web interface – Examination Centre. The generation of different test variants for each participant is linked to the functionality of criteria definition, on which base the individual test is generated. The creator of the test has the right to define these criteria, which ensures the system's flexibility. Granting different evaluation opportunities will be based on the rules of *HeRMeS V*, similar to the *Surveys* module.

6 Practical results of modules implementation

The tests for usability and functionality of the newly designed modules were conducted in an organisation operating in the IT sector. About 250 employees work in the organisation. Its structure includes standard functional departments: Administration, Accounting, Human resource, etc., and two specialized departments - one that develops software for customers "on demand" and one that develops and maintains the organisation's main software product. The staff hierarchy is on three levels - operational staff, team leaders and managers [41].

6.1 Examination of employees' knowledge

An annual assessment was carried out in the organisation which is part of its policy and involves all employees. It provided an opportunity for performance appraisal of employees during the past year. Subsequently, the results were used for analysis and correction of the intraorganisational policy. On this base the employees were divided into three major groups [42]:

- employees with annual performance below the organisation average
- employees with average performance
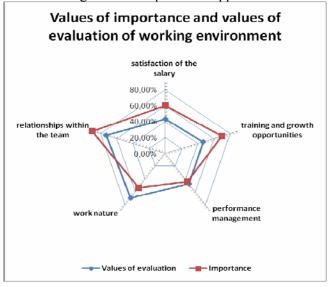- employees with excellent performance – top talents

The organisation wanted to examine further the reasons behind the low performance of the first group of employees. It was assumed that this could be due to low competences, lack of motivation or

misunderstanding with colleagues, managers, etc. Therefore, an examination was performed in order to check the professional skills of employees closely linked to work processes. After the examination the employees were split into two groups – employees well acquaint with their specific work (32% of all examined), and employees with low competences (68% of all examined). Obviously, the lack of knowledge is not the reason for the well-skilled employees' poor performance. Most probably these results ate due to work environment problems or lack of motivation. It is necessary to further study the reasons behind these results and, if necessary, to undertake policy corrections. The low-skilled employees obviously need training in the areas where their knowledge is not sufficient. On the other hand, in a time of a financial crisis they form a group for possible job cuts when reduction of costs is needed.

6.2 Survey of the working environment

The *Surveys* module was tested during a study of the working environment in the organisation. A survey was used, consisting of 25 closed questions with a choice of only one answer, plus one question, including marking of three statements. The study aimed at determining employee satisfaction in five key factors of the working environment [42]:

- internal relations among employees;
- satisfaction of the salary;
- evaluation of the feedback system (performance management);
- character of work;
- training and development of opportunities.

Fig. 5 Survey results for factors of company working environment

The survey was carried out in the whole company, and all employees took part in it, using the new *Surveys* module. The HR specialists designed the questionnaire and associated all employees, who used the *Self-Service Survey* for responding, with it,. The final analysis was completed by the HR specialists using the integrated rules in the *Surveys* module.

The generalized results for the investigated factors of the working environment are shown on Fig. 5. It is clear that employees are satisfied with most of the relationships between colleagues (73.00%) and work nature (69.33%). Factors characterized by lower satisfaction are performance management (47.31%), opportunities (46.59%) and level of salaries (43.11%). It should be noted that the most important factors for employees' satisfaction (training and development, and payment) did not correspond fully to the staff's expectations. At the same time, internal relations and team work are highly appreciated by them.

The deeper analysis of the survey results indicated the following [41]:

- *Internal relations among employees:* The average age of employees is 27 years, and most teams and team leaders do not have large age differences. The high qualification of employees (most having MSc or at least BSc degrees) and the development of informal contacts are facilitating the closer contacts among them, as well as diminishing the distance between leaders and ordinary staff. All these factors contribute to a positive assessment by most employees of their relation with colleagues, and the overall collaboration climate. This factor could be considered as one of the driving forces for company development. However, the risk of transferring possible personal conflicts to the working place, and thus decreasing the efficiency of collaboration should be taken into account.

- *Character of work:* The main tasks of employees are linked to software development using new technologies, investigation and satisfaction of clients' needs. The different projects of the company require interdisciplinary skills – not just software development competences, but also knowledge in the area of finance, accountancy, healthcare, banking, etc. The broader and more challenging context of software development is assessed very positively by most respondents. Although the work in the department, developing the main corporate product is not very diversified, it is involved in the application of new technologies and has opportunity to exchange knowledge and experience with the colleagues from the other departments which

enriches both sides. Therefore, the character of work is very highly ranked by employees.

• *Performance management:* The feedback of managers on the performance of employees is given on a monthly base. However, the survey results showed that some improvements could be made. For example, a recommendation was given for an introduction of a more formalised system for performance management linked to 6-months objectives achievement. In addition, it was suggested to assess team work, individuals' creativity and initiativeness, as well as carry out monthly review and update of objectives. Self-assessment, scheduled to take place before the formal attestation, is another proposed measure. Furthermore, another need was pointed out: the design of balanced scorecards for employees, including measurement of performance and difficulties faced in achieving of the given objectives. Link of the performance measurement results to the reward system is desired as well.

• *Rewarding:* The fixed salary given currently is unrelated to quality and scope of completed work. The work towards team goals is also not assessed and introduced in the rewarding system. Therefore, the introduction of a two-fold reward system was recommended. It would be based on the scale of achievement of team goals and the contribution of each employee in the process. This may require enlarging the individual objectives with the 6-months team goals. As a result higher team integration could be achieved and greater efficiency and quality of work. In addition, the introduction of a second component to the individual basic salary was suggested– a bonus divided equally among team members.

• *Development opportunities:* It was recommended by survey respondents to investigate the training needs of employees and to ensure a career development plan for each individual, including training and building competences according to real personal needs, as well as other working areas of the company where the employee has an interest and potential. The impact of such measure could be higher flexibility of the labour force.

Finally, it should be noted that this company had not performed such kind of a survey before. It provided the management with basic information for identifying problems, analyzing alternatives, and deciding on further actions to increase the satisfaction with the factors of the working environment considered [42].

7 Conclusion

In the knowledge society HR skills, competences and knowledge are assessed as an essential factor for competitiveness and growth. Presently, intellectual capital is highly valued and becomes part of an organisation's total market value. As one of the key components of intellectual capital, human capital directly affects the status of the company - its innovation and adaptability, the ability to provide quality end-products or services – bringing competitive benefits and higher revenues. Therefore, in the heart of every successful corporate strategy should be the human capital development and its optimal use for the organisations' success and prosperity. At the same time, regular communication with employees and ensuring a mechanism for obtaining feedback from employees could increase the results of any strategy implementation, and in particular help the organisation to improve the working processes, to identify problems and levels of engagement, and to determine the most appropriate incentives and factors for improving the working environment. There is a need to encourage employees to give regular feedback in order to create the conditions for creativity and to commit them stronger to the organisation. Such surveys become a powerful management tool, which is increasingly going into practice. A HRMS is necessary to provide similar functionality for maximizing the awareness of opportunities and employees' status. The survey may be in different areas, even indirectly associated with the HRM, in order to support the management policy of the organisation and its practical implementation.

The new e-tools presented in this paper provide HRMS with new functionalities, and thus, higher opportunities to HR specialists to be involved in strategic analysis of the company. The new modules have essentially increased the potential of the whole HRMS, and with their support during the practical testing described above knowledge gaps in the organisation were identified, as well as problems of employees with their working environment. It depends on the leaders to act upon the feedback obtained and ensure the successful development of their organisation.

Finally, it should be stressed that for the organisations' higher competitiveness it is necessary to understand the whole picture: the current state of their business, where has it been and where is it headed. This information can only be gathered through a combination of reporting and analysis, both via corporate reports and via ad-hoc analysis

performed by answering unpredictable and immediate questions.

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