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The role of human resource management in innovation processes through programming methods

This article discusses the principles of object-oriented human capital development using the technology program. The priorities of the strategy of industrial-innovative development of Kazakhstan in conditions of integration into the world community are studied. The tasks of human resource management in the implementation of industrial and innovation development are shown. Particularities of Kazakhstan's theory of management staff are shown, as well as the specificity of the Kazakhstan authorities is determined. The factors are considered which are affecting to the people in the organization of HRM mechanisms in the conditions of innovative development of Kazakhstan.

Key words: programming, human resource management, innovation, investments, innovation process, HRD model, innovative development, integration, management of the personnel, transformation, economic potential, competitiveness.

Human capital is a key, and by all accounts increasingly important, part of the resource-base of firms. Human resources have been called the «key ingredient to organizational success and failure», including success and failure in company innovation performance. It is important to understand why and how human capital encourages innovation, and what deployment of human resource management (HRM) practices inside the firm can produce desired levels of innovation performance.

Individual employees, founders, or executives may *directly* give rise to superior innovation performance, as in the cases of «innovative genius» and «stars» among. Such human capital is substantially above-normal in innovative capacity, whether this is innate (personified, perhaps, by Bill Gates or Steve Jobs) or acquired through training efforts. University researchers that create entrepreneurial start-ups exemplify the direct link between human capital and innovation performance. Superior innovation performance may also be the result of the «capabilities» stemming from the interactions within a firm's human capital pool [1; 31].

The organizational set-up of the firm, notably its human resource management practices, also matter to the contribution of human capital to innovation performance, and it is that effect that we mainly address in this chapter. Thus, management deploys training arrangements, makes decisions on reward structures, sets up teams, allocates decision-rights and so on, and these arrangements have implications for the contribution of human capital to innovation.

The influence of these practices may be modelled both in terms of mediator (human capital mediates the influence from HR practices to innovation performance) and moderator (practices weaken or reinforce the link from human capital to innovation performance) models.

Extant research suggests multiple mechanisms through which such HRM practices influence the relationships between human capital and innovation. Employee communication networks, as partly shaped by organizational structure, may influence innovation. Motivational research demonstrates that the kind of creative behaviours that underlie successful innovation is stimulated by some kind of rewards but reduced by others. Managerial styles, the use of feedback, the setting of goals, the use of teams and projects, have all been argued to influence creativity and innovative behaviors.

Organizational practices related to the sourcing, deployment, and upgrading of human capital have been identified in various literatures as influencing innovation performance at the level of firms, networks and industries, and regional or national innovation performance. These practices are important constituent components of «innovation» or «dynamic capabilities». A significant part of such practices are those organizational practices that relate to the attraction, selection, training, assessment, and rewarding of employees. They also include organizational practices that may not conventionally be seen as HRM, such as quality circles, extensive delegation of decision rights, management information systems, and formal and informal communication practices in the firm.

Many companies today face a constantly intensified global competition demanding that they transform themselves and their production on a regular basis. In order to achieve a competitive position and thereby also survive, companies are dependent on their flexibility and ability to adapt and respond to the environment.

Human Resource Management (HRM) has a crucial function in stimulating innovation processes in companies, by affecting creativity and knowledge sharing. However, this function is rather difficult to manage. They have to manage the fact that feasible solutions to novel problems do not just arise, and recognize that knowledge or expertise is only one factor that influence creative problem solving; i.e. to develop something new requires more than the existing knowledge. Their ability to combine and reorganize information and knowledge in order to develop new understandings or new conceptual systems is a key to creative thoughts that hence also influence creative problem solving. Furthermore, HRM then has to care for the intrinsic motivations that often drive creative individuals [1; 54].

HRM involves management activities for hiring and managing employees, processes for informing and negotiating and also activities concerning disciplining employees. Therefore, HRM is argued to be an aspect of all management in general and not just the exclusive work tasks of HR professionals. In this thesis, I will however by HRM refer to the HRM practices done by the HR department and the HR professionals and its contribution to creativity and innovation processes. The activities and practices that are in focus in this study affect employees directly, but also indirectly since HRM by HR professionals operate indirectly through managers in their work to manage and support employees.

Leadership and management are central for creativity in organization, when considering a system perspective. Management decides what kind of behavior is and is not creative and decides to what extent creativity will satisfy the organization's need for renewal of products or services. By being able to support and reinforce creativity, the role played by leadership is important. By creating an environment that is less bureaucratic with less tight structure and by encouraging openness to new approaches, permitting autonomy and risk taking, reward creativity and innovations as well as providing challenging environments and building feeling of self efficacy in employees, management can facilitate creativity.

The organization and managers can influence the development of the three components of creativity. Expertise and creative thinking skills can for example be influenced by problem solving, training in brainstorming and lateral thinking. These components are however more time consuming and more difficult to affect than motivation of employees.

Despite of the fact that intrinsic motivation partly is dependent on the personality, the organization actually has its most direct and strongest influence on motivation, which in turn can have a significant effect on the individuals creativity.

Motivation for creativity is argued to possibly be influenced by minor organizational changes, divided into six categories of managerial practices: challenge, freedom, resources, workgroup features, supervisory encouragement and organizational support.

Challenges include matching the right people with the right assignments. This match refers to the combination of the person's expertise, the skills in creative thinking and intrinsic motivation and based on this combination, challenge the ability of the individual in a balanced way.

Freedom is referring to giving employees autonomy regarding the process in itself, the means to perform a work task but not necessarily the end. Clear goals may rather enhance individual's creativity.

Resources such as time And money are affecting creativity and should therefore be distributed carefully. In some circumstances, time pressure is argued to enhance creativity, since it can increase the sense of challenge which may increase the intrinsic motivation. Too tight and impossible deadlines as well as fake deadlines may on the other hand eliminate creativity.

Regarding work group features, the importance of the design of the teams that are supposed to develop creative ideas are emphasized. A diversity of backgrounds and perspectives and a mutually supportive group are aspects argued to be important.

Supervisory encouragement is important for sustaining the passion and the intrinsic motivation for a work task. This is referring to the recognition, rather than extrinsic rewards, of creative work by individuals and teams. In opposition, harsh skepticism and time consuming layers of evaluating an idea could damage creativity. Supervisory encouragement can also support all three components of creativity by being a role model, being persistent when working on tough problems and to encourage collaboration and communication among the team members [2].

Organizational support is enhancing creativity by implementing appropriate procedures and systems or by clearly stating values that clarifies that creative efforts are prioritized. By directing collaboration and knowledge sharing, all three components of creativity are supported.

Knowledge sharing is, as well as creativity, argued to be a prerequisite for innovations to occur and is therefore an important aspect of the practice of organizational support.

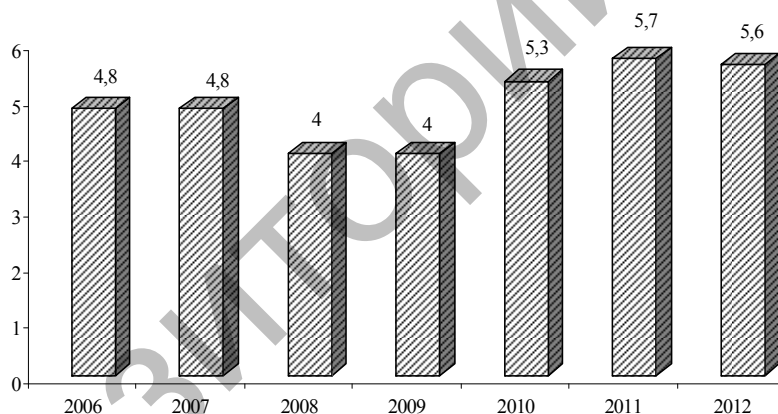
To be able to develop new ideas and products, employees must have enough knowledge about the field they operate in to move it forward. To support knowledge sharing and exchange of ideas in the organization is therefore argued as important for promoting creativity. Knowledge sharing requires a willingness to collaborate with other employees in the organization. The decision to share knowledge is very much dependent on the perceived benefits and cost for sharing, such as self interests, costs in time and effort and the sense of giving away power. Since trust reduces the feelings of vulnerability, it is argued to be important to encourage trust between employees in the organizational.

At the beginning of 2012, in the manufacturing industry of Kazakhstan, due to the aging of equipment and not competitiveness of production capacity utilization hardly reached 55 %, as a result of the low labour productivity. Depreciation of fixed assets by industry amounted to an average of 43 % and approximately 33 % of the non-oil companies' failure to participate in programs forced industrialization.

Based on the survey analysis Center of JSC «National innovation centre», held in 2010, because of the poor condition and lack proper of the 24 % of the non-oil companies were not ready to implement complex projects and cannot participate in the technological modernization of the economy [3].

The industrial base in Kazakhstan is such that, with the exception of the commodity sectors remaining units industrial complex look obsolete, archaic, and a number of important parts of engineering, entire industries of light and food industry were lost. Because you cannot start to innovate with not modern, obsolete, archaic production. Modernization must precede innovation. Modernization should be a universal source of simultaneous challenges of the post-industrial and innovation economy [4].

As a result of the conducted research is one of the actual problems of innovation is the problem of risk evaluation of innovative projects as a major constraint on the innovative activity of enterprises, along with the lack of financial resources, human resources, poor efficiency of State support, a poorly developed legislative base is high risk [5].



Note. Created by author based on data from the Agency of statistics of the Republic of Kazakhstan.

Figure. The level of innovation activity of enterprises in Kazakhstan in 2006–2012, %

Innovative risk problem is closely related to the uncertainty of the condition of and processes for innovation, as well as the uncertainty surrounding the external environment, with the probabilistic nature of unwanted occurrence with event. Therefore, research and evaluation of innovative risks always closely associated with the analysis of uncertainties, and effective ways to prevent unwanted ion of events, lower levels of risk associated with a targeted reduction in uncertainty.

The full potential for innovation risk is calculated on the basis of:

1. Data on possible innovative risks and scenarios for innovation project when their effects;
2. Information about the probabilities of the risk and the corresponding probability scenarios of the development of the innovative project

$$P_A = \sum_{i=1}^n P(H_i)P(A/H_i), \quad (1)$$

where P_A is the total probability of innovation risk, $P(H_i)$ is the likelihood of the i -th innovation risk, $P(A_i|H_i)$ is the probability of a development scenario of innovation project subject to the i -th innovation risk.

Using the formula (1) we come to mathematical, probabilistic evaluation model of innovative risks, which allows to evaluate not only the innovative company engaged in risk innovation, separately, but the total probability of all risk and innovation scenarios for the development of innovation enterprises of the innovative risks.

Let's look at an example using this method. Let the enterprise develops the basic innovation with the highest risks, which, for example, can be: get the negative result, the denial of certification results and getting the result. These risks are denoted by, respectively, the H_1 , H_2 and H_3 . The likelihood of these risks, as appropriate:

$$P(H_1) = 40 \% = 0,4;$$

$$P(H_2) = 35 \% = 0,35;$$

$$P(H_3) = 25 \% = 0,25.$$

Moreover, it should be noted that the sum of probabilities of all the risks should be equal to 100 %.

As a result of these risks the company may lose investor. The probability under the risk described above, is equal to, respectively: 30 %, 10 % and 15 %.

In our notation: $P(A|H_1) = 0,3$; $P(A|H_2) = 0,1$; $P(A|H_3) = 0,15$.

We find the full potential of innovation risk and determine the fate of the basic innovation.

We will use the above formula:

$$P_A = 0,4 \cdot 0,3 + 0,35 \cdot 0,1 + 0,25 \cdot 0,15 = 0,12 + 0,035 + 0,0375 = 0,1925.$$

Thus, the full potential of innovative risk is 19.25 %, that is for the basic innovation of valid value and contributes to further its implementation.

Based on the foregoing, it must be noted that for each type of innovation has its specific risks, which is hampered by the lack of uniform regulations and theoretical and methodological recommendations, the issue of development which, in times of crisis, there is the most severe [6].

Industrial-innovative development of the country implies high quality employees, the higher the quality, the more likely the success of complex technologies and technical equipment.

However, in the process of modernization begun, updates, principal of a number of industries, such as machine-building, metal-working, etc., are facing acute shortage of highly qualified specialists, which the national labour market are still present. And because the current foreign oil companies in Kazakhstan, opening new Western-style production with appropriate techniques, due to the lack of staff is widely practiced by engaging its professionals.

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А.Т.Омарова, М.Ф.Грело

Ақпараттық әдістер арқылы инновациялық процесте адам ресурстарын басқару ролі

Мақалада программалаудың технологияларын қолдануы арқылы адами капиталының объектілі-бағдарланған дамуының қағидаттары қарастырылған. Сондай-ақ жаһандану аясында Қазақстанның индустриялық-инновациялық дамуының басымдықтары терең түрде зерттелген. Адами ресурстарды басқаруда индустриялық-инновациялық дамудың жүзеге асыру тапсырмалары, қазақстандық персоналды басқару теориясының негіздемелері және өзгешеліктері көрсетілген. Қазақстанның инновациялық даму жағдайында адами ресурстарды басқару тетіктерін ұйымдастыруда адамдарға әсер етуші факторлар анықталған.

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Роль управления человеческими ресурсами в инновационном процессе с помощью методов программирования

В статье рассмотрены принципы объектно-ориентированного развития человеческого капитала с применением технологий программирования. Изучены приоритеты стратегии индустриально-инновационного развития Казахстана в условиях интеграции в мировое сообщество. Показаны задачи управления человеческими ресурсами (УЧР) в реализации индустриально-инновационного развития. Проанализированы особенности казахстанской теории управления персоналом, а также обусловлена казахстанская специфика УЧР. Выделены факторы, оказывающие воздействие на людей, в организации механизмов управления человеческими ресурсами в условиях инновационного развития Казахстана.

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Проблемы современного состояния экономики Казахстана через трансферт технологий в среде «Stata»

В статье предложена разработка теоретико-методологических основ и научно обоснованных рекомендаций по развитию системы трансфера инноваций и технологий, ориентированной на решение ключевых задач форсированного индустриально-инновационного развития Казахстана, с использованием средств компьютерного моделирования.

Ключевые слова: трансферт, новые технологии, инновационная деятельность, прогнозирование, математико-статистическая модель, экстраполяция рядов.

Трансферт новой технологии на момент её разработки, т.е. в начале её жизненного цикла, обусловлен стремлением компании к формированию и поддержанию монопольной власти на соответствующем товарном рынке. На данном этапе интерес к владению новшеством проявляют, в первую очередь, малые, вновь организуемые с этой целью фирмы, обычно создаваемые носителями внедряемой технологии. Другой категорией покупателей новой технологии являются представители крупного бизнеса, монополизирующие уже существующий рынок и намеревающиеся с приобретением новшества обеспечить за счет его консервации или развития укрепление своего экономического положения. Обладание уникальной технологией дает возможность её владельцу в течение определенного времени на вполне законных основаниях получать сверхприбыль от её использования.

Чтобы доработать технологию и довести её до уровня, когда становится возможным тиражирование, обеспечивающее получение дополнительного дохода, нужны дополнительные вложения капитала (и финансового, и интеллектуального). Таким капиталом обладают либо представители крупного бизнеса (финансовые ресурсы), либо носители знаний (интеллектуальный капитал). По данным мировой статистики, в среднем в общем объеме затрат на разработку технологии научная составляющая занимает 33,5 %, патентование и лицензирование — 4,6, работы в сфере дизайнера и изготовления конструкторско-технологической документации — 24, анализ рынка — 6,6 %. Для завершения разработки необходимы дополнительные вложения капитала в патентование новшества — в расчете 0,137 долл. на 1 долл. затрат по НИР, на разработку дизайнера нового продукта — 0,716 долл., на маркетинговые исследования — 0,197 долл. [1].

Трансферт технологий на внутреннем рынке осуществляется в рамках уже рассмотренных выше схем. Промышленные предприятия остро ощущают необходимость инновационной деятельности и стремятся осваивать технологии, которые обеспечили бы им импортозамещение и повышение их