Chapter 7
INTRODUCTION OF MODERN INFORMATION TECHNOLOGY IN THE ECONOMIC SYSTEMS MANAGEMENT

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AGILE METHODOLOGIES AS A DRIVER FOR EFFICIENT HUMAN CAPITAL MANAGEMENT

These days IT companies are among the first ones to introduce innovative ways of management. That is because they are themselves working with innovative products. That is why increasing productivity and implementing innovative tools is crucial for them. Numerous researches [1-5] proved that innovations bring about profits increase for the company. And the company innovativeness itself majorly depends on its human capital. This all speaks of the importance of managing human capital properly to get maximum productivity, though in the way it also stimulates creativeness and innovation, but not just makes its human capital exhausted.

In the recent years, there were many studies dedicated to the importance of soft skills over hard skills [6, 7]. The first type of studies shows us that in the nowadays world with its digitalization and transformation to post economic values, the soft skills tend to grow their importance, especially on top positions (business owners, CEO, CTO, top managers, etc). At the same type, the workers with a higher level of soft skills development are more likely to go smoothly to other career levels. As a results, human capital, especially in the context of soft skills development bring about positive results for both: the company, as well as its workers.
At the same time, many researches prove the importance of general company’s human capital development, apart from individual one [8, 9, 10] They show that the well-developed human capital serves to the general creativeness, as the individual workers’ human capital without the team interference, ideas sharing and general work may bring much less results than in case of group knowledge. In case of well communicational level, the workers share their background, broad vision, creative ideas and thus increase the level of general human capital of the company.

This all logically brings to the increase in number of methodologies and strategies which pay more attention to harmonizing technical and communicational parts, increase creativity level, soft skills and company’s human capital as a whole. There are various ways of managing IT production in the company, depending on the terms, goals and specifics: Agile model, Waterfall model, V-model, Incremental model, RAD model, Iterative model, Spiral model. In the latest years most IT companies transfer to flexible (Agile) methodologies family, as in most cases it proves to be more efficient than others in the context of timing, productiveness and human capital boast.

According to official Agile Manifesto, individuals and interactions are more important than processes and tools, working software is more important than comprehensive documentation, customer collaboration is more important than contract negotiation, responding to change is more important than following a plan [11]. We may draw a conclusion that Agile methodologies family have flexibility and communication as its main distinctive features.

In general, we offer to split the Agile Software Development Life Cycle into two main parts: technical and communicational, as described by us in Figure 7.1.

The basic cycle may vary, depending on the project, terms and specifics. It is stated, that for successful project development, it is crucial for some workers, such as project managers, to develop an efficient two-way conversation between executor and stakeholders, as well as plan, manage and monitor it [12]. Among the requirements for Business Analyst, the globally recognized standard for the practice of business analysis, among technical work, group the stake holder and analyze their communicational needs, state the following requirements, explain the possible solutions to stake holders and their business affects, keep stakeholders engaged, facilitate communication through formal meetings, face-to-face final product review, etc. [13]
Of course, communications, meet-ups and discussions may be rather broad in reality and can easily lead to miscommunication, misunderstanding between customer and vendor sides. That is why in various guides and tutorials it is stressed that each and every idea, message or discussion point must be fixed whether on a simple paper sheet, email message or on special software. Tools, such as mind mapping are also often used for such purposes and bring about clarity and order into the whole structure. This all leads the companies to the demand in proper management, the one with applicable estimations, productivity measures, goal evaluations, controlling and other management tools.

One of the most frequently used development methods for proper management in Agile is Scrum. The big amounts of work are divided into small, but logically finished parts (sprints) that usually start with appearance and design and end with final testing. Before the start of each sprint, all requirements, wishes and tasks are being documented. Such documentations are the results of the communications with stakeholders and require great analytical, logical and structuring skills to bring the most important and required tasks to the developers. All
development process on every sprint should be on full control, as the
development itself is performed rather quickly and should be done
properly, though in case of bugs, they must be reported as soon as
possible and fixed right away.

Agile methodologies were among the first ones to introduce the need
of specialists in between of technicians, developers and the customers.
They have added workers in between, to estimate, control,
communicate, translate general terms into “technical” language and lots
of tasks needed to keep good communication and thus prepare a product
corresponding to the expectations, estimate tasks and goals and control
the development process as a whole. In case we compare the current
methodology to the older ones, such as Waterfall, we may see the major
drawbacks they have: the whole development is a grand step-by-step
process, which is not flexible and any change or mistake may be fatal;
the control process is rather complicated and broad as well. One of the
biggest disadvantages of using old development methodologies is the
unharmonized working force. By this we mean that step-by-step big
development brings about the fluctuate load of the workforce, and thus,
either unused potential or a big load that eventually exhausts the human
capital and is notorious for not being enough productive.

Agile methodologies and their principles can be used as a
professional tool for human capital management. One of the common
ways to encourage the team being Agile, control and improve the human
capital efficiency is to measure and improve the level of being “agile”
by dividing the measurement into the following: categories that mean
being Agile, the behaviour itself for being agile, and the methods
through which it is possible to make measurements. The categories that
include being agile may include, but are not limited to the following
ones: personal behaviour (which includes sharing the knowledge and
thus increasing the group knowledge capital, participating in challenges,
etc), which can be measured individually with various indices, team
progress level, timing for reaching certain goals and other; the behaviour
of the entire team (which includes tangible and intangible
measures,
such as the level of creativity and innovation, initiative, group
knowledge, the attitude, etc), which can be measured through the level
of reached goals, timing and other; the relationship between the teams
involved (which includes sharing, initiative, readiness for changes,
flexibility, meetings and discussions), which can be measured through
the number of additional requirements (negative index), comments and
feedbacks, number of activities performed together); the results or
outcomes (which include the MVP (minimum viable product), growth, etc), which can be measured through the revenue itself, growth level and other. Since Agile methodologies may bring most benefits to the ones who use it with an efficient team in a healthy environment, the measurements of the general health level also take place in human capital management. The evaluation includes measuring the mood of the workers day by day. Such statistics shows the general attitude, as well as potential and prospective of the team, because one of the accents of Agile is team work, and each team player has affects other ones and as a result, may increase or decrease the timing, attitude and as a result, efficiency and quality of the product. Keeping track of such data may be carried out with the help of various tools, starting from primitive methods like filling the tables and ending with professional software and tools, such as Niko-Niko calendar that tracks the mood of each worker day by day.

The other crucial point of increasing general efficiency and managing the team properly managing human capital of the firm is measuring the team behaviour. One of the ways to do it the way it has biggest outcomes is performing such measurement on each development process stage, starting from planning the sprint and ending with the final review. The main goals that are connected to the team behavior at each sprint may include the following ones: reaching consensus between teams, getting to same understandable conclusions, getting same view on requirements, fast and efficient common work, etc. This can be measured even with simple questionnaires at the end of the meeting/conferences/demonstrations, which include questions and point of view sharing regarding the level of communication clarity, the speed for responding to new requirements and changes, whether it is easy or hard to reach the responsible party, whether the skills correspond to the level of tasks, general experience, etc. By analyzing the data provided, the team management may get a clear understanding on the cooperation between involved teams that leads to the general time frames of delivering/getting a product, its quality and correspondence to the requirements.

In regards to managing human capital efficiency through team outcomes in context of bringing business values, it is important to evaluate the relationship between them. Such, in most of the tasks (whether it is design or code development), the responsible party should find the correlation between the task they do and the business value this task brings – customer satisfaction, higher efficiency, increased revenue
or it limits or reduces the drawbacks like risks or bigger costs. Which is why the worker should be fully aware of how the certain task is applies to the mentioned values and how it influences them so they may build the working process in the way it best assures them.

Each iteration in Agile should be guided by the KPI (Key Performance Indicators) which are vitally important for efficient product development process.

For the business process optimisation, the organizations may divide the KPIs, depending on the business stage or type of work. It may be rather useful to divide them into the following categories: decision-making KPI, Phases KPI, Sprints KPI, SCRUM KPI as per Figure 7.2.

![KPI in AGILE](image)

**Figure 7.2 KPI divided into development stages**

The decision-making process can be taken as the first stage with the own performance indicators. The indicators can serve as an efficient tool for making proper decisions and evaluating them. By using the KPI within the stage of agreeing, the management may concentrate on both – main functionality, as well as on strategic goals. Which is why, taking into consideration main business goals and strategies is being crucial. Decision-making KPI may vary, depending on the requirements, software, timing and other specificities. As well, we emphasise on the importance of the position the certain worker obtains. Such, the decision-making KPI may include the criteria:

- Time spent on creating a meeting plan.
- Meeting continuation.
- Time spent on version review.
- Time spent on discussion.
- Time spent on summary report.

Of course, the timing depends on the workers’ professional knowledge, experience and abilities (the level of their human capital development). Additionally, some methodologies, such as RACI matrix and Influence matrix may be used for a better control of the labour and improving its efficiency and lower the timing. It is reasonable to
consider RACI and Influence matrixes as tools of managing human capital together with KPI. By using them, it is easier to settle the communication part of business, organise all the stages of such process (preparation, approval, goals estimation) together with getting an understanding of responsible parties or workers in each process. These results in shortening the time, lowering the risks of estimating wrong goals, disapproval and other issues connected to wrong communication process (Figure 7.3). Such approach gives managers the tools to understand and properly evaluate the communication part of work, which is notorious for being uneasy to be estimated carefully.

![Figure 7.3 Tools for efficient human capital management in Agile decision-making](image)

The other important stage in Agile iterations is sprints. They may be considered as most important part of the software development. Since the sprint usually starts with the list of tasks and all supporting documentation and ends with a release/demonstration, each part of the sprint should be managed to get best efficiency, including evaluation of tasks and proper KPI. Such, sprint design is carried on standardly in Agile, though the design format (style, texts, images, animation, etc) is affected by the KPI, since the creative processes may be carried on for different time frames depending on intangible factors, like inspiration or creativity, which is why the strict time frames, defined in the KPI are defining the potential design. Of course, introducing KPI to creative parts in agile may bring about negative changes in case the management does not have all knowledge of the process and defines the terms which would either lead to poor quality design, or to tremendous time losses, which would afterwards affect other stages of the process. For managing human resources properly, the responsible parties must evaluate requirements for creative tasks (such as design) and correspond them to
timing, after which providing the KPI. Thus, though agile makes possible managing the efficiency of workers that perform creative tasks, by evaluating terms, approving the requirements and tasks (efficiently due to the use of the RACI and influence matrixes as well).

Since most other processes are being more technical, starting from setting the goals, providing proper requirements, getting approvals and ending with the development itself and testing afterwards are being easier to measure. It is important to set the proper priorities in tasks, with taking into consideration the order, importance and the difficulty and timing. The order of tasks should be prepared including the cooperation between workers, so each task is performed in logical order to avoid the dependency conflicts when one task could not be completed without the other one. The team manager should assign the tasks according to the experience and efficiency level of the worker, as well as taking into consideration the soft skills of a team member, because assigning the task that does not properly correspond to soft skills of the worker (though fully correspond to knowledge and experience) may lead to the loss of efficiency and increase in timing as various tasks may require communication, double checking, suggestions or team work. In order to properly assign them, the manager may use the previous tools to get a proper understanding of the capabilities and potential outcomes of the workers, and even form the team accordingly to increase general efficiency.

One of the ways of measuring the team efficiency is through velocity (commitment and work completed), as velocity is vital for the project and its level may influence both – the demand for the developed project (especially if the software needs to be prepared in conditions of some trends, or may be an urgent governmental task), as well as the relationship between customer and vendor. Since each project backlog consists of the number of story points, the velocity measurement is done through comparing the level of completed story points per every sprint in average. By tracking the speed the analysis shows not only the level of the skills of a team, but also gives an understanding for the correspondence between costs and time. It is reasonable to track it for a long period of time in order to draw accurate conclusions. Such, after introducing Agile the team may have low velocity, through after a few months it usually shows increases. In case the level stays the same or even decreases, it may speak of the internal or external factors, apart from skills, that cause such negative tendencies. Among these may be unhealthy environment, exhausted human capital and others. Though, in
case the team members or the team lead has left the certain projects, the calculations and tracking should be measured from the start to achieve the proper results.

Another way to manage human capital and increase efficiency is keeping track of the sprint burndown chart. This method is intended to show general performance, but not just the number of completed tasks per team member or the entire team. The sprint burndown chart has a number of stories that need to be completed in the certain sprint with the sprint days. It should be filled in and built the way it reflects how many stories need to be done to finish the sprint. The perfect sprint burndown chart should be a straight diagonal line from left top corner of the bottom right corner, meaning all the tasks are approximately the same in terms of time and difficulty, and are performed gradually at the same speed. Of course, that is being almost impossible to reach in the real company performance, since the tasks vary from one another in terms of skills needed to complete it, the volume, the number of subtasks and accordingly timing needed to complete it. Though, it is possible to check the average and general team performance with this chart and make the forecasts. As well, in case of the tasks are approximately on the same level, the gaps in the chart may speak of different issues, such as: bad understanding of the task (poor documentation, low level of communication), unclarity, disturbing factors and other.

As well, the efficiency of human capital may be increased by analysing the release burndown chart. This method is often used for such purposes. This chart shows how much work should be done before the release. It clearly indicates the current progress, so in case of managers spot changes or issues in there, they may quickly introduce the changes in time to deliver the product in a proper time frame. Basically, the logic of the chart is almost the same as the sprint burn down chart, though it is more global, as it shows the total amount of sprints (basically, the whole project) and the amount of them that are left till the final release. As in the previous case, the perfect flow is a straight line from left top corner till the bottom right corner. The further it goes from the perfect one, the bigger are the chances of some issues occurring in the project. As well, it is possible to manage the working force so it fits the adjustments that may have been made because of previous changes. The analysis of this chart allows to make predictions whether the release would fit the set deadline, and if not, the management may see when and what may be performed or introduced to speed up the process and not losing the quality at the same time.
These mentioned tools, as well as the KPI, are being effective for a proper human capital management on the development stage. Their proper usage may positively influence the efficiency of both – individuals and team as a whole (Figure 7.4). KPI for an individual or a team may be also considered as per fitting the timeframes and completing the certain task or the list of tasks in certain time frames and corresponding to the proper quality level that can be afterwards approved by testing. Of course, the KPI for an individual varies from the KPI for the entire team, though the logic and principles are kept – timing, quality, efficiency, etc.

![Figure 7.4 Ways to measure individual and team efficiency in Agile development process](image)

Figure 7.4 Ways to measure individual and team efficiency in Agile development process

All the listed tools and methods for management, measurements and controlling human capital efficiency bring about the data to form the changes whether to increase the outcomes, or lowering negative impacts. By analysing the data, the management can clearly see the points and processes that require changes, as the mentioned measures are split into processes, stages, parties and separate tasks. It is important to harmonise the tangible and intangible aspects, as low efficiency and performance may often be the result of unhealthy environment or poor or exhausted general human capital, but not only hard skills of the workers. Which is why big companies are each year are paying more attention to increasing the human capital and creating the healthy environment by introducing reasonable remuneration packages, offering trainings or courses for the workers, preparing team building activities and improving the general atmosphere in the working spaces such as proper office design, entertainment products, and inside of the office activities to improve relationship between team members that results in
better understanding each other, better communication, and thus flexibility, intention to reach consensus that leads to increased efficiency.

At the same time, we would like to mention that the tools used in Agile methodologies, as well as its main principles may be used not only in IT fields, as the one that is among the first ones to introduce and experience the new methodologies and studies, but as well in other more regular fields like transport, manufacture and other. The new era we came in makes accent on knowledge, communication, relationships and intangible values, which means the human nature is being changed as part of an evolutionary process, and as a result the human capital as whole. Which is why switching to other approaches, methodologies and thus tools, used for measuring and improving its management is crucial.

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AC Counting
INNOVATION IN
UKRAINE IN THE
CONDITIONS OF
EUROPEAN INTEGRATION

Introduction. Innovative transformations are a major driver of modern economic space development, but accounting is considered by both scientists and users to be a conservative and well-established system. Business planners typically do not set strategic goals for