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A NEW METHOD TO ENHANCE WORKFORCE PRODUCTIVITY: TASKS OPTIMISATION AND PROMOTION OF COLLABORATION

Recent studies have focused on how social relationships impact productivity. In a number of such studies, social aspects are analyzed, showing, among other issues of interest, that participating in social groups positively affects employees self-esteem and performance. In this article it is shown how this applies to the new and more competitive company model being adopted in Europe. Workflows are submitted to a very rigid structure imposed by an organization itself, this limits and restricts the interaction of a certain employee with a group of people from the same organizational unit. This work attempts to show how new tools can help organizations be more flexible.
Keywords: task management; GTD methodologies; workforce optimization.

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НОВИЙ МЕТОД ПІДВИЩЕННЯ ПРОДУКТИВНОСТІ РОБОЧОЇ СИЛИ: ОПТИМІЗАЦІЯ ЗАДАЧ ТА ПРОСУВАННЯ СПІВРОБІТНИЦТВА

У статті представлено сучасний тренд досліджень залежності між соціальними зв'язками та продуктивністю. Доведено, що соціальна взаємодія підвищує самооцінку персоналу, а також позитивно впливає на його продуктивність. Занадто жорстке структурування робочих потоків всередині організації обмежує можливості для взаємодії (в тому числі неформальної) персоналу. Нові ж інструменти організації вирішення задач, представлені у статті, можуть допомогти організаціям стати гнучкішими у вирішенні багатьох питань.
Ключові слова: менеджмент задач; управлінська методологія GTD; оптимізація робочих процесів.
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В статье представлен современный тренд исследований зависимости между социальными связями и продуктивностью. Доказано, что социальное взаимодействие повышает самооценку персонала, а также позитивно влияет на его продуктивность. Слишком жёсткое структурирование рабочих потоков внутри организации ограничивает возможности взаимодействия (в том числе неформального) персонала. Новые же инструменты организации решения задач, представленные в статье, могут помочь организациям стать более гибкими в решении многих вопросов.
Ключевые слова: менеджмент задач; управленческая методология GTD; оптимизация рабочих процессов.

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1. Introduction

Having details of the structure of social relationships within an organization and a deep understanding of the way they affect this organization can be extremely important for its development and for individuals that belong to it. In the broadest sense, organizations are a mean to allow people achieve or carry out tasks that they value or desire. The nature of social relationships emerged within an organization affects its members' learning process and at the same time has an effect on the level of compliance regarding the objectives of the organization or a group. The development strategy focuses on human capital, which positions the organization to competently approach future changes.

In an organization, internal design depends on differentiation, on the division of work (tasks) and on the coordination established. Though this network structure is rigid and strict, parallel new types of networks appear. These non-official social networks are used to exchange interpersonal information and are of great interest from the perspective of learning inside organization (Borgatti, Foster, 2003; Cross, Sproull, 2004). Participating in formal or informal structures is an essential aspect (Lave, Wenger, 1991). However, the importance of social relationships for acquiring knowledge and learning to face one's tasks at work (and improve the output) is still an undervalued aspect (Cross, Borgatti, 2003). By properly exploiting social networks we find an interesting path to avoid role based barriers, which are the most evident handicaps for achieving an acceptable level of compliance in tasks. Such interactive process can be defined according to the scheme where individual actions are able to generate learning models useful for both organization and individual (von Kutzschenbach, Bronn, 2010). The longer two individuals are emotionally involved, the more time and effort are both willing to invest for the benefit of each other, whenever collaborative barriers are overcome (Jenkins, 2008).

Both types of workforce interaction must be combined considering the learning needs of the individual, the network architecture (Lessig, 2004; Lockton, 2009), and the use of a language that favors the integration of individuals. We intend to enhance informal infrastructure as a useful complement to formal infrastructure.

In the following sections, we present a method to track how tasks are assigned to employees, by whom, how they are planned and scheduled and allow the worker to collaborate with others by distributing parts of his/her tasks.

2. Exploiting collaboration mechanisms in corporations

Corporations have a certain organization to control how tasks flow and how they are executed by employees. In (Perkins, 1993) it can be seen how much effort is put from the corporation side to have the best workforce. To accomplish this, corporations tend to generate a figure for a kind of employee whose main occupation is to control how tasks are distributed and when they are finished successfully. It is obvious that a wrong planning on how tasks are divided, distributed and timed, surely drives the organization to fail in its purposes.

The conventional structure of European corporations is very rigid, and this limits the environment and imposes bounds to potential knowledge to be generated. Working networks created in each department are structured where the employee probably may feel uncomfortable, because the aggregation to others is imposed and he/she is assigned a tight role. In social and informal networks that authors promote

by using the proposed tool, tasks are also informally assigned to colleagues (which not force them to attend such tasks). The barriers among departments are removed by trying to softly relate coworkers. Employees also demand channels through which they can freely speak their minds. As a result of this, they are motivated to capture and exploit more information and, what is more, in a more convenient way, while participation in work groups also improves. Obviously, these are all positive aspects. In fact, the time spent by a worker with colleagues is of vital importance for his/her input, see (Steinfield, Ellison, Lampe, 2008). In (Hwang, Kessler, Francesco, 2004) it is shown that the time spent by a worker in a group with coworkers is an exceptional vehicle to acquire information and knowledge, and therefore improve his/her input.

It is obvious that sharing knowledge (collaborating with others) may make an employee lose his/her privileged position, but this investment is proved to have a highly valued social counterpart (Marks, Polak, McCoy, Galletta, 2008). A particular contribution of an employee should be properly recognized by upper hierarchical layers of the structure, the method we propose in this paper offers the mean to do it.

3. Method to track tasks and promote collaboration in corporate environment

The unique procedure to measure employees' productivity is by getting a feedback about the amount of tasks they perform day. This feedback is commonly obtained by an individual by filling a task's document where he/she must state what he/she did, how long it took and which problems were met. Employees spend their time working to be useful for a company or institution. Frequently this report is, therefore, filled quickly and tend to be imprecise, so many details may be not accurate. If we consider that company's workforce needs to be tuned by means of this feedback and may this information be not accurate, we can conclude that the tuning of workforce is not optimal so our production cannot be improved. Not having a proper tool to track and get accurate feedback on how workers are performing with the workloads being scheduled for them may be catastrophic for the whole company. Each coordinator will do tasks assigned with a number of estimated hours to accomplish them. What if the coordinator is not estimating assignments properly? The success of the whole process will be ruined. It is therefore advisable to consider the productivity of each worker related to certain workloads, and have appropriate information of who may be of help to accelerate the task if a worker enters into a bottleneck. A mean to recognize collaboration should also be considered being included in the company's procedures. A feasible solution to what we underline as a path to improve productivity is to integrate a system to measure/instrument tasks, track them and get effective feedback to be integrated into HR software packages or to be exposed to coordinators to seize the workforce of their employees.

3.1. Corporations and their model to track tasks. Companies need a way to check whether their workforces are tuned or not. Which metrics to apply? Reviewing the literature, we can see this is a hot spot. In fact, to guess if workforce is properly scheduled, companies must consider individual productivity first, then analyze the workforce schedule and probably propose new schedules, as stated in (Thompson, Goodale, 2006), individual productivity is on 3 factors (1) the task, (2) the workload and (3) the worker. As (1) and (2) may be variables, then a workforce scheduling should also be flexible, in this sense allowing collaboration beyond the department or organizational unit is advisable. This flexibility can be achieved with a tool to track how workers are dealing with tasks. To obtain this feedback, programs like Meta4,

SAP etc. are used. The way tasks are tracked in these packages is not transparent and, for example in Meta4 there is no way to achieve it.

3.2. Proposed model for tracking tasks. Within this corporative environment an employee can collect his/her tasks as soon as they are delivered. Tasks can be collected using personal devices such as personal smartphones, and if needed easily ported to a computer. It is preferable to maintain tasks and task management separated. When a new task is started, an employee should activate the timer for that task, then stop the timer when finished. This is a very simple way to always have in mind which are the next things to put effort on and the priority, deadline, involved colleagues.

When a new project is started or the need for a new task arises, then the person in charge of scheduling and delivering tasks simply should get access to a web interface, start a query on employees, their actual workloads, their profiles and all relevant information that may be of interest. The task is assigned by providing data such as: ideal starting date, recommended deadline, priority (this parameter might be configured according the current overhead of the worker, timings etc. and can be set to rise as the deadline approaches), recommended collaborators (so to the recommended persons an alert of a potential work is sent). All this data is packed and sent to the "inbox" of an employee.

3.3. Coordinator's role as the tasks scheduler. Each coordinator must adopt a turn in his/her methodology to adopt it to the new framework. From the traditional model where the coordinator is the centric actor to the new model where the worker becomes an important part. The coordinator must create possible recommendations of collaborators beyond his/her department (or even within). In addition, he/she is responsible for the number of hours in which the worker must work on a certain task. So, the concept of TASK is born with a very different concept to the former concept. It is therefore evident that the coordinator must create TASKs with a certain degree of collaboration with other coordinators, and not only regarding the objective of the task but also the timing and the priority of a task to avoid overload.

Hitherto, there is no way the coordinator can get to know, efficiently, how overloaded an employee is. The coordinator must immediately have a mean to get feedback from the effort their colleagues/workers are paying to work in the proposed task. The tool to create tasks must provide a way to describe a task, give it a priority, deadline, and some recommendations, relationships with previous and future learning tasks (so efforts can be reduced by reusing knowledge), with other colleagues. The tool to track tasks must allow the coordinator to provide the required information in order to make the task a suitable item into some organization methodology. In our case, we selected GTD (Getting Things Done), a very successful methodology (Heylighen, Vidal, 2008) to get all work done. Tasks created by a coordinator are sent to a server from where a worker can collect them later.

3.4. Employee's role. Being a worker under the current corporative model means being submitted to unreal schedules, and being able to deal with tasks when they are supposed to be dealt with. So it is not just working in a certain task but in the correct task at every moment. This affects productivity negatively. A wrong schedule may cause the worker fail in getting the targets he/she is supposed to get, and nobody told him/her. This has negative consequences for individual's motivation. Helping him/her in getting organized is not only important but a must.

From an employee's perspective, the proposed methodology consists in fixing tasks as they are received. How the employee distributes his/her time is as important as the task to be done in each moment. It is also important to reuse knowledge, so it would be important to underline common aspects for tasks so the employee is revealed indirect knowledge and tasks are finished faster. An important aspect that makes our method unique is that tasks are created by persons that are not going to accomplish them, an aspect to consider. Therefore, the information that gives birth to the task is much more complete because the person who is creating the task has knowledge on the upcoming tasks, other related tasks from other projects, former tasks etc. The employee connects to a task provider, downloads a file with the tasks; the application in his/her smartphone collects the tasks, organizes and schedules them. When the employee is to deal with a new task, he/she simply starts the application and gets recommendation on deadlines, priority, time estimated to accomplish the task.

4. A tool for the method proposed

The architecture for implementing a solution to efficiently track tasks was based in a client-server model. The server is in charge of uploading and distributing tasks to employees or students. The task creation process is a quite sensible procedure. Coordinators must do their best to equip the task with all the documents that may help (this is used also to evaluate the efficiency of a coordinator), if there are similar tasks (from this project or from others that may help in accelerating by reusing components, knowledge or collaborations), in one word, the coordinator not only creates a task and assign it, but takes care that the task is well defined.

The system must differentiate tasks creators and tasks consumers. It is quite easy to implement such a difference by creating two different applications, one of them (the one used to create and upload tasks) is a desktop based application with credential login (Figure 1) and restricted access. The other one is a smartphone application that simply collects, organizes and recommends what to do and why.

Producers have an interface to create tasks. Consumers have an application tailored for their devices, used to collect tasks (and leave the proof of a task being collected), time it, and provide feedback. Consumers get data as soon as it is uploaded. The logic behind this is as simple as writing and reading from a local file system.
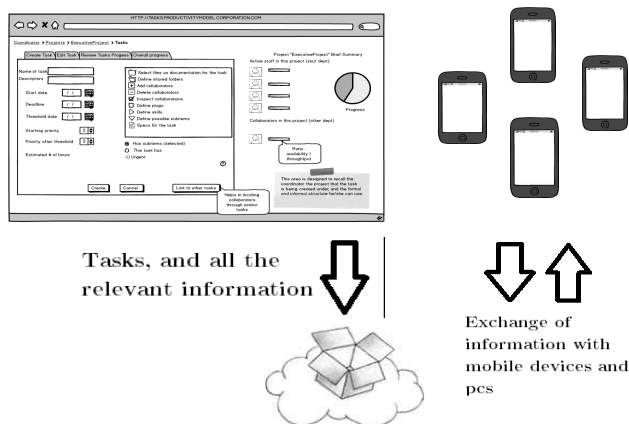

Figure 1. **Architecture of the system**

The web connects to dropbox to create and organize tasks . Whenever a change is made, the dropbox alerts to those devices that are subscribed, tasks are therefore delivered to all mobile devices using a transparent file system through a cloud. Devices, following the same method delivers the information on tasks and planning.

The employee's module (software on their mobile devices) is provided for Microsoft Windows smartphones, the porting to other platforms such as Android devices is straightforward. From the workers' point of view, the application is activated on demand. The result of this connection is the reception of an XML file in a device. This XML file contains the complete description of the task. When the application is running, the tasks that the user has downloaded are organized automatically following the GTD methodology, and the user has clear directions on which task may start first and which tasks are urgent, which are about to exceed the recommended deadline etc. The tool allows the user to create additional private tasks. The employee is provided with the global status report on the ratio of completed vs. not completed tasks. See Figure 2, here the user can also check the collaborations that he/she enjoyed and can credit that collaboration to enhance the productivity of those who helped.
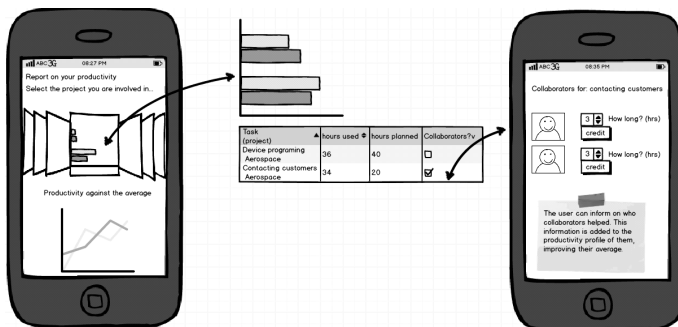
On the left, the consumer is shown the available tasks' sources and is given the option of enabling and disabling sources. On the right, the consumer is given the global status report of his/her own performance.

Figure 2. **Meta information on the tasks provided to consumers**

One of the key aspects of the methodology is the ability to review if there are tasks to be completed, new tasks etc. As important as reviewing the inbox is the timing of tasks.

When an employee starts working on a certain task, he/she must activate the timing on that activity. If asks for some collaboration, then should activate the "others are helping" because that who helps is activating "Collaborating with" this way we are able, not only, to instrument how well we did the tasks assignment (the worker would need no collaborations and finishes the task on time) or the employees' ability to solve problems but to instrument a mean to make a worker be compromised with his/her coworkers as he/she is informed with detail on the status of his/her tasks and how he/she is affecting to the productivity of his/her colleagues.

5. Scenarios

This methodology has been put into practice in two different local scenarios: academic and private sector. Academic scenario was represented by the University of

Almeria. Academic institutions are experiencing a deep change in their methodologies as they are adopting the Bolonia's model (EEES model). In this model the student is the main role of the system. The student must administer his/her task with the ability not to exceed deadlines and harm his/her grade qualification marks. In this scenario, lecturers adopt the role of being coordinators. A lecturer sends tasks to students (setting deadlings, priorities etc.) and the student grabs them on mobile devices. Tests were passed to our academic colleagues and to students.

Lecturers report that now thanks to this methodology, planning is more realistic and the complexity of tasks is modulated (making them a bit more simple, allowing students to activate collaboration or providing master documents to help students). On the other hand most of the students found this methodology as a not invasive mean of keeping their work updated. The population under study was over 300 students, 75.4% of them said that they were motivated as they were completing tasks, and this made them be more likely to start new tasks. 42% said that the collaboration was a great idea as they could meet new peers and learn from them, the remaining 58% still think that it is not a good idea to share knowledge in a competitive environment such as academic one. Regarding final grades, it is difficult to establish a comparison as the students were on a certain course and they were not the last year in that same course, so we compared the statistics as an average with the students enrolled in 2012 and those enrolled in 2013 that were submitted to the experience. The results on average are mostly the same (there is a slight trend to raise their marks by 0.12 points out of 10) but what we find interesting is that the dispersion was slightly reduced.

The second scenario where we tested this methodology is a private company operating in what is called the third sector (entity with a social implication). FAAM (federacion de personas con discapacidad de Almeria — Federation of handicapped persons of Almeria) has about 200 employees, they are scattered in day care centres (where the elderly can spend the day while their families are at work). The main office is where they coordinate all the day care units. There are many departments that due to their nature are related but they exploit the collaboration and have no mean to instrument how efficient it is. The coordinated work is mainstream as they obtain their incomes from state and autonomic grants and from services they offer to their affiliated associations (for handicapped persons). Each worker has many task to accomplish, the planning is provided in paper documents, very often they put effort in tasks that are not truly urgent and they harm the productivity of other colleagues. The system was tested in two departments of the HQ office. We did not test the system in the day care units as the tasks there (as much as they are related to persons) are clear and follow a routine. These departments involve more than twenty persons that usually work independently from the rest. Each department responsible has neither idea of the real workload, nor a report of the real progress of urgent tasks. In addition to this, at the end of the year, the departments must create a report of the actions carried out (tasks, projects, time involved etc.). This report is done at the end of the year (and not as tasks are closed which is the ideal situation). The report is not accurate, it does not contain information that may help the workforce to reorganize.

After 5 months of using the system, the coordinators of each department reported that now they have an idea closely related to the reality of the workforce, it is clear who is the bottleneck and which sort of tasks are time consuming, both coordinators

said. This tool also invites peers from other departments to collaborate in tasks they are experts, because they are hunting credits to earn higher rank (in the report that is sent to the directive staff), so it is a way to increase productivity indirectly by means of competitive collaboration. Idling employees are, now, more involved as it was clear that their attitude exposed the work from their colleagues to failure. An added advantage, as both coordinators said, is that the annual report is made day by day with a detailed log of each person activity. From the employees side, the system was not seen as intrusive as they all use smartphones daily. The system was found to be annoying for a small percentage of employees (people with a non technological profile and at the mature age). Others said that you should have always in mind that when starting a task you should start/stop timers, but that apart from that it seemed to be useful.

6. Conclusions

Corporations invest capital in creating plans to organize their workforce. Companies, especially in Europe where their productivity is to be increased in order to be more competitive, are moving towards more dynamic employees, so much more coordination is required. There are plenty of methodologies to organize how tasks should be accomplished but they lack effectiveness due to a poor integration with workers.

Task management is an important issue in huge corporations and educational institutions. Implementing a system that allows an integrated management helps users to work better, and organise to better schedule its workforce. An important issue provided with our implementation is that we are able to offer feedback of the tasks completion and promote the collaboration between peers of the same corporation or entity.

Acknowledgment

References:

Agarwal, N., Liu, H., Tang, L., Yu, P. (2008). Identifying the influential bloggers in a community. (WSDM'08). Palo Alto, California, USA.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Borgatti, S.P., Foster, P.C. (2003). The network paradigm in organizational research: A review and typology. Journal of Management, 29(6): 991−1013.

Cho, H., Gay, G., Davidson, B., Ingraffea, A. (2007). Social networks, communication styles, and learning performance in a CSCL community. Computers & Education, 49: 309−329.

Cross, R., Borgatti, S.P. (2003). A relational view of information seeking and learning in social networks. Management Science, 49(4): 432−445.

Cross, R., Sproull, L. (2004). More than an answer: Information relationships for actionable knowledge. Organization Science, 15(4): 446−462.

Heylighen, F., Vidal, C. (2008). Getting Things Done: The Science behind Stress-Free Productivity. Long Range Planning, 41(6): 585−605.

Hwang, A., Kessler, E.H., Francesco, A.M. (2004). Student networking behavior, culture, and grade performance: An empirical study and pedagogical recommendations. Academy of Management Learning and Education, 3(2): 139−150.

Jenkins, H. (2008). Combating the participation gap: Why new media literacy matters. UC Berkeley School of Information. Retrieved September 2, 2010, from http://www.ischool.berkeley.edu/newsandevents/events/dls20080206.

Lave, J., Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Learning in doing: Social, cognitive and computational perspectives. Cambridge University Press.

Lessig, L. (2004). Free culture: How big media uses technology and the law to lock down culture and control creativity. New York, NY: The Penguin Press.

Liu, L., Weisong, S. (2010). Trust and reputation management. IEEE Internet Computing, 14(5): 10–13.

Lockton, D. (2009). Architectures of control in consumer product design. En MPhil Technology Policy Dissertation, Judge Institute of Management, University of Cambridge. Retrieved from http://econpapers.repec.org/paper/wpawuwpot/0512009.htm.

Marks, P., Polak, P., McCoy, S., Galletta, D. (2008). Sharing knowledge. Communications of the ACM, 51(2): 60–65.

Pan, Z. (2010) Trust, influence, and convergence of behavior in social networks. Mathematical Social Sciences, 60: 69–78.

Perkins, N.S. (1993). Workplace literacy issues in the pulp and paper industry. Pulp and Paper Industry Technical Conference, 1993. Conference Record of 1993 Annual. 130–137.

Steinfield, C., Ellison, N.B., Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. Journal of Applied Developmental Psychology, 29(6): 434–445.

Tang, L., Liu, H. (2010). Toward predicting collective behavior via social dimension extraction. IEEE Intelligent Systems, 25(4): 19–25.

Thompson, G.M., Goodale, J.C. (2006). Variable employee productivity in workforce scheduling. European Journal of Operational Research, 170(2): 376–390.

Von Kutzschenbach, M., Bronn, C. (2010). You can't teach understanding, you construct it: Applying social network analysis to organizational learning. Procedia – Social and Behavioral Sciences, 4: 83–92.

Yan, A., Stella, Y., Tian, W., Vogel, D., Kwok, R.C-W. (2010). Can learning be virtually boosted? An investigation of online social networking impacts. Computers & Education, 55(4): 1494–1503.

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