IT PROJECT MANAGEMENT
CHALLENGES AND INNOVATIONS
IT PROJECT MANAGEMENT
CHALLENGES AND INNOVATIONS

Editor
Maciej Rostański

Contributing authors:
Marek Pyka
Bogumiła Krzeszowska-Zakrzewska
Grzegorz Zakrzewski
Wojciech Muras
Elitsa Petrova

University of Dąbrowa Górnicza

Dąbrowa Górnicza 2015
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strategic management and project management in IT organization</td>
<td>Marek Pyka</td>
<td>11</td>
</tr>
<tr>
<td>1.1. The necessary terminology</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>1.2. Strategic management and project management</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>1.3. Business with IT - Organizational Governance</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>1.4. IT Governance for Business-IT Alignment</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>1.5. IT Strategic Triangle Management</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>2. Organizational Methodologies – „Where are we now, where do we want to be and what to do to get there?”</td>
<td>Marek Pyka</td>
<td>27</td>
</tr>
<tr>
<td>2.1. COBIT – how to build IT strategy</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>2.2. ITIL – IT Service Management</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>2.3. MOF</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>2.4. Management Paradigms</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>3. Management Methodologies – “How to do it well?”</td>
<td>Marek Pyka</td>
<td>43</td>
</tr>
<tr>
<td>3.1. PRINCE2:2009</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>3.2. Project Management Book of Knowledge (PMBok) ver. 5</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>3.3. Comparison of PMBok and PRINCE2:2009</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>4. Manufacturing methodologies - the productive and the adaptive</td>
<td>Marek Pyka</td>
<td>55</td>
</tr>
<tr>
<td>4.1. Rational Unified Process methodology</td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>4.2. Microsoft Solutions Framework (MSF)</td>
<td></td>
<td>61</td>
</tr>
<tr>
<td>4.3. Agile Project Management and SCRUM</td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>4.4. Comparison of Traditional and Agile Project Management</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>4.5. Project Management hybrid methodology – Case study</td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>4.6. Summary</td>
<td></td>
<td>79</td>
</tr>
</tbody>
</table>
5. IT project management in outsourcing environment ....................... 79
Bogumiła Krzeszowska-Zakrzewska, Grzegorz Zakrzewski
5.1. Outsourcing .................................................................................... 80
5.2. Market of outsourcing services ...................................................... 85
5.3. IT outsourcing project management ............................................... 90

6. Project manager in IT outsourcing project ....................................... 92
Bogumiła Krzeszowska-Zakrzewska, Grzegorz Zakrzewski
6.1. Virtual teams in IT outsourcing project teams ............................. 100
6.2. Communication tools – example research .................................... 103
6.3. Summary ....................................................................................... 107

7. Leadership as a driver for innovative projects – the key challenges and
winning solutions .................................................................................. 109
Wojciech Muras
7.1. Enterprise Infrastructure - transformation from hierarchy structure to the
process owner ......................................................................................... 110
7.2. The new paradigm of projects - consolidation, collective work, the
strength of the recipient ........................................................................ 111
7.3. Sources of innovation - collective intelligence ............................... 115
7.4. Summary ....................................................................................... 119

8. Open Source and Innovative Solutions for Project Management ...... 122
Elitsa Petrova, Maciej Rostański
8.1. Open Source Software for managing projects ............................... 124
8.2. Innovative software solutions for project management .................. 127
8.3. Conclusion ..................................................................................... 132
Dear reader,

This monograph takes on the issues on project management specifically related to the management of an IT-related environment: systems, departments and businesses. Modern economy needs IT. Modern economy thrives with IT. Innovative or not – most implementations in business and government environments need IT tools, techniques, structures and systems for many things, like processing ever-growing data, providing competitive services, or protect its continuity.

The book in your hand is an outcome of a gathered experience and knowledge of an experts related to Project Management and the Project Management in IT specialties at the University of Dąbrowa Górnicza, Poland. In editor’s opinion, the unique combination of Management and IT related experts, which all have large practical knowledge, had resulted with quality content of rare nature.

To take into account the modern environment and a constantly changing IT environment is a challenge. A challenge in which the contents of this book try to help with, explain or simply bring into attention. I hope it is going to be helpful in whatever projects You are going to be involved with, start, or finish.

Scientific editor,

Maciej Rostański, PhD

University of Dąbrowa Górnicza
1. Strategic management and project management in IT organization

Marek Pyka

Project management is often said to be an accidental work caused by the pressing need and an additional set of duties. Only recently has it become a consciously chosen occupation by the specialists, who are well trained to perform such tasks. Still, if we ask our children who they want to be in the future, they won’t response – Project Manager! We keep on getting a doctor, fire fighter, police officer or even an IT specialist as an answer, but, unfortunately, not the Project Manager…

This situation is caused by the fact that this profession is based on receiving the task before providing necessary preparation and practical knowledge. Unfortunately, such an attitude often leads to the huge amount of mistakes, failures and financial loss; it’s like that, because project management cannot be learned from books or manuals, but requires practical experience supported by extensive knowledge. A wise Project Manager starting his journey with this profession uses the knowledge contained in the project management methodology to avoid mistakes and moreover, uses good management practices, thanks to which his projects meet expectations and previously set objectives.

Project management is the domain accompanying us in the daily life, however, we do not pay much attention to its planning. Let’s, for example, take into consideration the diploma work planning project; how much time did we spend on planning and how much on doing it? Did everything go according to the plan? If yes, congratulations, because it is not often.

Project management in the organization, manufacturing unique products and services is something much more complicated. One must realize that project in the organization is only the consequence of our strategic decisions made on the business level and it is a tool enabling its occurrence. It is impossible to understand the meaning of project management without the relations between strategic management in the organization, IT department
and business processes realization which constitute ecosystem for realized projects. The necessary part of this chapter is an elaboration on the IT organization „management pyramid” and the enterprise mission realization mechanisms through well – managed IT projects (cases).

1.1. The necessary terminology

What is the project (IT)?

We often hear in the IT specialists talk „I’m finishing project X and starting project Y”; the term project is so widespread nowadays that we have forgotten about certain principles of the venture so as to call it the project. There are many definitions of what the projects are, but we can combine them and create a few simple claims:

- They have a definite amount of time and budget;
- They are goal and/or product oriented;
- There is special team established for the Project realization;
- They require coordination mechanisms for connected with one another actions and tasks;
- They are managed by a qualified manager;
- And probably the most important – they are the response for current Client or Organization needs.

What is the Project Management?

It has been just explained what the Project is, so it is about time to explain what the term Project Management means. A good definition of the project management process is that it is an art of unique ventures. If we asked the Project Manager what is the aim of Project Management, he would immediately answer: “it leads to … (and here would appear a few bad choice words) the end”. Of course, it is the practice, and according to the theory, the answer should be like: „The main goal of the Project Manager is leading a specified project to the end, provide a ready-to-use product that meets all the requirements and objectives in the previously set time and budget”. The Management Process itself is a set of all the activities enabling realization of the definition above.

Determinants presented above have become the main principles of every project manager and are parts of so called „triple restriction” or „project
“triangle”. They are the main focus of most activities of each manager. Good project ecosystem management enables efficient realization of clients’ needs and the selection of suitable methods and resources guarantees receiver’s satisfaction. The Project Management Process is strongly connected with identification of needs, which must be fulfilled (realized in the organization). Unfortunately, the organization’s resources very often are not enough for all the needs fulfillment and that is why we often are not able to realize all the required projects. In such situation, it is crucial to take a look at the Business Case so as to determine which projects should be realized first in order to keep the organization developing. The choice of projects is based on the resources quality, costs involved in the project realization and external clients’ needs. As you can see, making the decision on the projects hierarchy is not an easy task; it requires the analysis of many business, technical and social factors. The choice of projects to be realized is extremely important, because it determines the development directions, resource location and organization commitments for an extended period of time. In such cases we will talk about the Strategic Projects for the organization development. Another group of projects consists of the project ventures taken on as the response to the constantly changing business needs, such external stimulus as RFP (request for proposal) or IFB (invitation for bid).

The second group of projects very often requires of specialists to take variety of actions, allocating time and resources used in other projects. This is the reason why the business intelligence will be crucial for estimating potential chances of the project realization and the level of engagement form organization. In some cases, the profit and loss balance is adverse for the potential client.

In contrast to the project management, operational management is primarily up to date executed, and its basic function is to maintain the infrastructure of the organization. The area of IT services and operational management was formalized by introducing a set of IT service management standards such as ITIL (IT Infrastructure Library), COBIT (Control Objectives for Information and Related Technology) and ISO / IEC 20000. Figure 1 shows IT links Management framework together with conventional fields of application in different types of businesses.
1.2. Strategic management and project management

Project management is a tool realizing business needs determined on the level of the organization strategic management. Organization management differs from the project management. Good understanding of the organization principles in the management process enables the project managers to avoid traps and situations which may exert a negative influence on the current project. Every Project Manager is aware that during realization of each project, there are certain difficulties and problems and that is why he tries to adjust his and the team’s work style to the existing conditions in the organization. The basis for understanding how to manage the organization is realizing that “Enterprise management is based on balancing actions performed for the benefit of organization with the intention of realizing its aims in the flexible way; reasonable use of resources, no waste and efficiency that lead to the aim” (Griffin R., Management, 10th Ed., Cengage Learning 2010).
The table 1 presents the main differences between management of project and organization.

Table 1. Comparison of enterprise management and project management

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Enterprise Management</th>
<th>Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks</td>
<td>Repeatable</td>
<td>Not repeatable</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>Permanent</td>
<td>Not permanent, limited in time</td>
</tr>
<tr>
<td>The complexity of the task</td>
<td>Small, medium</td>
<td>High or very high</td>
</tr>
<tr>
<td>Delivery time</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Expenditures, costs</td>
<td>Small, medium</td>
<td>High or very high</td>
</tr>
<tr>
<td>Risk</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Competency</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Innovation</td>
<td>Slight</td>
<td>Large</td>
</tr>
<tr>
<td>Standardization</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

According to the rules of aerodynamics the bumblebee should not fly. Analysis of the organization where projects are implemented can lead us to a very similar conclusion - the organization without strategic management, a coherent business vision and mission, cannot be effective and successful implementation of any type of projects. For many project managers, it is clear that most of the problems that they are facing cause misunderstanding of the nature of strategic management at the strategic level. This is compounded by behaviors such as imprecise rules work, “micromanagement” of top management, problems with the availability of critical resources, irrational budgeting management, etc. This behavior makes project management a very difficult task. We must remember that such situations arise in every (or almost every) organization. Leading projects we need to be aware of them and properly prepare management strategy. Lack of awareness and understanding of these mechanisms often leads to frustration and delivering of statements like, “I’m thinking that it would be much easier to realize my projects, if all my company, with its management, budgets, lawyers and clients vaporized... beyond the boundaries of Earth”. The attitude like this is a result of organizational management mistakes and a lack of symbiosis between the management at the strategic and the executive level. Experience baggage collected...
by Project Manager confirms them in the need to implement projects outside the adopted Organizational Governance. In the long term, this attitude must finish in defeat of PM and his project team. The relationships between strategic and executive management (including project management) are shown in the Figure 2.

**Figure 2. Project management location in the organization management**

In many cases project management can be a solution completely separated from the strategy management of organization. This applies especially to the organization in the early stages of development, but in stable managed organizations this situation has no right to exist. Projects are an integral part of the organization management model and developed governance. The level of integration of project management processes, their role and place in organization management are shown in (developed by McKinsey) 7s model, presented in the Figure 3.
Projects as a process and project management are based directly on the foregoing components of well managed organization. They provide appropriate mechanisms and resources for proficiently functioning and realizing all assumptions. From the strategic management of the organizations’ point of view, the projects are part of building business value (Shared value), founding organizations strategy (Strategy), must be implemented according with assumptions or/and procedures (Systems & procedures), there exist in the created frame structure and fully dependent of it (Structure), rely on highly qualified staff (Staff, Skills), they are in agreement and acceptance of business management of organizations.

Therefore, the planning and implementation of the project beyond its organizational context is impossible, because it would become the purpose in itself and lost main assumptions of the existence of the project. Experienced project manager tries to properly engage the whole environment (organization) surrounding the project to continuously support its actions. View of the environment of the project allows to identify major allies that can support the manager and staff implementation of project tasks (Fig. 4). The following
The diagram shows an ecosystem of stakeholders of the organization which support (or counteract) environment of the project and the manager.

**Figure 4. Project Manager and team in the realization of project tasks**

**IT organization management**

IT organization management processes belong to some of the most complex in the enterprise. Very often lack of these processes result in misunderstanding of the role of IT department in business process. Managers repeatedly see IT department as source of cost or even as a “necessary evil” of the organization. IT departments often earned this by themselves because of lack of willingness to understand business processes, analysis of the organization needs, the purpose of which is intended or lack of basic principles of budgeting. To change this, it has been developed a number of principles and good practices for transforming IT department into a strategic resource from business’s point of view. Well managed IT department becomes a partner in the development of enterprise mission and in a professional manner provides services which correspond the needs of the organization. The basis for the understanding of the IT organization management and its working methods can be noticed in services and implementation of project is “IT Pyramid organization management” presented in the following figure (Fig. 5).
As you can see in the diagram above, the highest level of the pyramid is a Corporate Governance and a collection of ISO standards that enable you to integrate IT operations level with management mechanisms of entire organization. Without a proper activity of the IT Manager at this level, it is very difficult to implement the projects that will meet the specific needs of the client (in this case, the entire organization). Carrying out the activity in this layer is mainly associated with identification and understanding of the mission, vision and needs of the individual business units. This layer is very often called IT Strategic Management.

1.3. Business with IT - Organizational Governance

Lack of partnership between Business and Information Technology is one of the top issues of management in information system of the enterprise. But, this alignment is described as an objective, which can never be completely achieved and needs to be adjusted within the organization frequently. To maximize alignment enablers and minimize inhibitors, various frameworks are developed for creation of IT Governance (ITG). IT Governance is an important concept for IT organizations in the enterprises.
Business competition is forcing enterprises to become agile, in order to be more competitive information technology (IT) plays an increase important role in improving operational process and guiding managerial decision making. Effective IT management and governance are particularly critical for all type of enterprise (small, medium, large). The alignment between business and information technology becomes a prominent area of concern. Since then, the importance of alignment has been well known and documented. View of business and technology alignment defines at which degree the IT mission, objectives, plans, and operations are supported by the business mission, objectives, and plans.

Furthermore, it involves “fit” and “integration” among business strategy, IT strategy, business objectives and IT infrastructure. However, a relevant “problem” is the understanding of what business and information systems alignment is how to obtain and maintain it.

Strategic Alignment Model (Fig. 6) developed by Henderson and Venkatraman is widely used as the base of Business/IT Alignment theories. This strategy model consists of four quadrants that consist of four components and processes. The linkages between the quadrants are important and all of the components are working together to determine the degree of alignment. The first linkage is the question of strategic fit, its vertical linkage refers to the use of a strategy to determine the infrastructure of the business. The second linkage is functional integration, its (horizontal) linkage is most directly linked to the alignment of business and IT.
Main concept of Strategic Alignment Model can be described as quoted from Value Based Management.net:

First arrow (1) – **Strategy execution**: this perspective shows business strategy as the driver of both organization design and the logic of Information Systems (IS) infrastructure (the classic hierarchical view of strategic management). Top Management is strategy formulator, IS Management is strategy implementer.

Second arrow (2) – **Technology Potential**: this perspective also shows the business strategy as the driver, however it involves the articulation of IT strategy to support the chosen business strategy and the corresponding specification of the IS Infrastructure and processes.

The top management should provide the technology vision to articulate the logic and choices pertaining to IT strategy that would best support the business strategy. In this case the role of the IT manager should be a technology architect who efficiently and effectively designs and implements the required IS Infrastructure that is consistent with the external concept of IT strategy (scope, competences and governance).

Third arrow (3) – **Competitive Potential**:

This alignment perspective is emerging IT capabilities to impact new products and services (i.e. business scope and business strategy), influence the key attributes of strategy (distinctive competencies), as well as develop new forms of relationship (i.e. business governance). Unlike the two previous perspective, this one allows the modification of business strategy via emerging IT capabilities. The specific role of the top management to make this perspective succeed is business visionary, which articulates how the emerging IT competences and functionality as well as changing governance patterns in the IT marketplace would impact the business strategy. IS manager role, in contrast, is one of the catalyst, who identifies and interprets the trends in the IT environment to assist the business managers to understand the potential opportunities and threats from IT perspective.

Fourth Arrow (4) – **Service Level**: This alignment scope focuses on how to build world class IT/IS organization within an organization. In this perspective, the role of business strategy is indirect. This perspective is often viewed as necessary (but not sufficient) to ensure the effective use of IT resources and be responsive to the growing and fast-changing demands of

---

1 Summary of Strategic alignment model. Venkatraman, Hednerson, Oldach. Depicted online: http://www.valuebasedmanagement.net/methods_venkatraman_strategic_alignment.html.
the end-user population. The specific role of top management is to make this perspective succeed and prioritize, which articulates how to best allocate the scarce resources both within the organization as well as in the IT marketplace (in terms of joint ventures, licensing, minority equity investments, etc.). IT manager role is making the internal business succeed within the operating guidelines from top management.

**Definition of Information Technology Governance (ITG)**

Information and technology governance (ITG) is a subset discipline of corporate governance first appeared in 1993. The ITG focuses on information and technology (IT) and its performance and risk management. IT governance is putting structure around how the enterprises align their IT strategy with their business strategy, ensure that the whole company stays on track to achieve business and IT goals, and at the same time perform the measurement of IT performance. Effective IT governance aligns IT investments that make the IT decisions and assigns accountability for the outcomes.

IT Governance is a part of Corporate Governance; corporate governance is define as “Corporate governance refers to the process and structure for overseeing the direction and management of an organization so that it carries out its mandate and objectives effectively.”(Office of the Auditor General of Canada, Dec 2000) The other parts of corporate governance are HR Governance, Finance Governance and Marketing Governance.

**Figure 7. List of elements for Corporate Governance**

Source: (based on Office of the Auditor General of Canada, Dec 2000).

IT Governance deals primarily with the IT related staff, connected the business strategy and goals with the IT management.
The definition of ITG is quite different from the other organizations. In Richard Brisebois’s “What is IT Governance?” his list of a various definitions of IT Governance is as below:

- The structure, oversight and management processes, ensure the delivery of expected benefits of IT in a controlled way to help enhance the long-term sustainable success of the enterprise.
- IT governance is the responsibility of management. It is an integral part of enterprise governance. It consists of leadership and organizational structures and processes that ensure organization to sustain and extends organization’s strategy and goals.
- A structure of relationships and processes to direct and control the enterprise in order to achieve the enterprise’s goals by adding value while balancing risk versus return over IT and its processes.
- Specifying the decision rights and accountability framework to encourage desirable behaviors in the use of IT.
- Governance is not about what decisions get made – that is management – but it is about who and how makes the decisions.
- IT governance is the term used to describe how those persons entrusted with governance of an entity will consider IT in their supervision, monitoring, control and direction of the entity.
- How IT is applied will have an immense impact on whether the entity will attain its vision, mission or strategic goals.

All the different definitions of IT governance come from the different situations which the enterprises are facing. From all these definitions, we can see that ITG is used as a strategic tool to keep the IT related work on track with the business goals and strategic objective.

**The importance of IT governance**

IT governance matters because it influences the benefits received from IT investments. IT governance is necessary because it is used to ensure the investments in IT, generate the value that is planned in the IT strategy. It can manage the IT process so as to control the risks in IT. IT now has become an important issue for a successful company, an effective IT department can promote the core business of the enterprise, like Brisebois, Boyd and Shadid said “This change process brought from IT, commonly referred as a “business transformation” is now the prime enabler of new business models both

---

in the private and public sectors”. On the other hand, in the Weill’s research, IT governance is defined as specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT.

Business transformation can promote the business, but at the same time, change will bring some potential risks, so how to balance the risk and rewards became a problem for these companies. IT governance is here to solve it. With good IT governance, an enterprise can:

- Provide strategic direction;
- Ensure that objectives are achieved;
- Ascertain that risks are managed appropriately;
- Verify that the enterprise’s resources are used responsibly.

**Five Domains of ITG**

In 2005, IT Governance Institute launched a model for IT governance which has five domains: Strategic Alignment, Value Delivery, Risk Management, Resource Management and Performance Measurement. Every one of them is important and cannot be absent to achieve the objective of IT governance to align the IT with Business. This five domain are presented on Fig. 8.

![Figure 8. Five domains of IT Governance](www.isaca.org)
• **Strategic Alignment**: This domain’s main focus is on the connection between the IT and business strategy also the business process with the IT operations.

• **Risk management**: This domain is focused on the risk control of the enterprise, transparency about the significant risks.

• **Value Delivery**: This domain’s focus is if the IT delivers the value against to the IT strategy, optimizing the IT cost and providing the intrinsic value of IT.

• **Resource Management**: This domain is mainly focused on the optimal investment in IT.

• **Performance Measurement**: This domain is focused on keeping track and monitoring the implementation of IT strategy, resource usage, IT process performance, IT project completion and service delivery.

### 1.4. IT Governance for Business-IT Alignment

With the increasing importance of IT used as an asset for enterprise to enhance their business competitiveness, more and more enterprise improves their investments on IT. Meanwhile, there is an increased complexity and a demand for both flexibility and control of the IT structures that are not really easy to combine\(^3\). IT governance is here to solve these problems, a good IT governance draws on the principles of corporate governance to achieve alignment and corporate performance goals\(^4\). In the study of Ulf, a framework has been supplied which is a structured way to address the area of transformation and business as well as IT alignment.

Strong foundations for Corporate Governance are provided by a set of international standards ISO. These standards allow the introduction of clear principles and best practices for management at the strategic level (ISO 9000, 9001, and other industry standards) or at the management level of IT contributory organization (ISO 20000, 27001, 22301, etc.). For the business vision, the most important standard for IT management is ISO/IEC 20000.

---


ISO/IEC 20000

The ISO/IEC 20000 standard is the international standard for IT service management domain. It was released in December 2005 jointly by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). ISO/IEC 20000 is the successor of the British Standard BS 15000, which was developed in the year 2000 to reflect the ITIL methodology and its knowledge and experience. ISO/IEC 20000 is usable for providing IT services both for the explicit external customers, as well as for the service provider’s organization internal needs. The standard can be used equally in both ways. ISO/IEC 20000 consists of two parts: The first part (denoted as ISO/IEC 20000-1: Specification) is mostly a description of a set of processes and requirements imposed on them (i.e. a definition what a given process should encompass). The second part (ISO/IEC 20000-2: Code of Practice) expands each process from the first part with additional recommendations based on contemporary ITSM experience.

There are several possible benefits gained by adopting the ISO/IEC 20000 standard:

- Embracing the ITSM domain knowledge and best practices, which the standard contains.
- Better alignment of business and IT strategy; many of the processes take into account the overall business strategy of the service provider.
- More customer-oriented IT; service delivery processes are managed and modified with regard to customers’ inputs, responses and reports.
- Better monitoring capabilities used, e.g., to account accurately for resources spend by the IT services provision, or for more efficient planning of future service demands.
- Obtaining the ISO/IEC 20000 certification by an auditor demonstrating the service provider’s will and commitment to addressing service quality problems. The certification can also be the formal prerequisite for gaining a significant customer or winning a public selection procedure.

Since ISO/IEC 20000 was designed to be closely aligned with ITIL, many of the ITSM topics exist in both documents. However, there are several differences between these two, conceptual and process ones. The main conceptual difference is a fact, that ISO/IEC 20000 (primarily its first part) is a set of mandatory requirements, whereas ITIL is a collection of advices and best practices. A whitepaper ITIL V3 and ISO/IEC 20000 summarize differences between ITIL V3 and ISO/IEC 20000. Some of the key differences mentioned are:
• ISO/IEC 20000 contains requirements for management responsibilities (in chapter 3), ITIL does not.
• ISO/IEC 20000 has a more rigidly defined approach to business relationship and supplier management.
• ISO/IEC 20000 requirements are completely independent of organizational structure or size. A service provider must use the structure that is most appropriate. ITIL includes advice and options for some aspects of organizational structure.
• Specialist advice is available for small organizations.
• ISO/IEC 20000-1 includes requirements for budgeting and accounting. Charging is not applicable for some organizations so cannot be included in a specification, where all requirements are compulsory. ITIL includes advice on charging.

This set of tools above allows you to clearly define the role of the IT Department and Technology in the enterprise. Properly developed integration principles of IT Departments with business process, change the perception of the role of information technology in the entire organization. Change of the organizational culture occurs in each unit in the entire organization.

1.5. IT Strategic Triangle Management

The strengthening cooperation between IT Departments and business units very often result in specific description of development strategy and functioning of the IT department. Strategic management of IT organization imposes change in the way of managing. The perception of IT is changing as expectations of organization for IT change as well. To meet the growing business demands, IT organizations need to translate developed a business-level assumptions on its operational work. Very often in the managing of the IT, organization adapts a different methodology and good practices to improve the work of the Department. In accordance with “IT Strategic Triangle Management” following methodologies are implemented:

• **Organizational methodology** – its goal is to properly organize the work of IT department so the processes are consistent and compact with the standards in the organization. This methodology also guarantees change the look of the IT Department prism in prism of client, service or business process. Within these methodologies are: COBIT, ITIL, MOF or Six Sigma.
• **Management methodology** – in this group there are inseparable proj-
ect management methodologies focused on a goal or product. The peculiarity of these methodologies is the appropriate organization of work task teams and integration of project management processes with IT management processes. This group of methods includes PRINCE2:2009, PMBoK ver. 5 or IPMA.

- **Manufacturing methodology** - as the name suggests these are the methodology focused on the manufacturing of the product. Due to the specific of the work these are often related to the type of product manufactured (service, software, website, etc.). Among these methodologies we can include the RUP, MSF Agile methodologies and all kinds of IE. SCRUM or eXtreme Programming.

The range of methodologies above set a picture of IT organization management at the level of integration with business process, the daily organization of IT work and the implementation or build new services and products using a Project Management process. The order of presented methodologies is not random. In the first step IT organization needs to make the integration with the business layers, establish rules for cooperation and integrate with business processes and then on the basis of identified needs find the right methodology which those needs will be follow through on.
2. Organizational Methodologies – „Where are we now, where do we want to be and what to do to get there?”

Marek Pyka

In the process of building a development strategy and the functioning of the IT departments a very important role is played by the COBIT methodology that unites business assumptions with strategic assumptions for IT.

2.1. COBIT – how to build IT strategy

Control Objectives for Information and related Technologies (COBIT) was first developed in 1996 by the Information Systems Audit and Control Association (ISACA) and the latest vision of COBIT is COBIT 5 launched in 2012. COBIT contains a number of measures, indicators, processes and best practices. COBIT as an open standard, is regarded as the guide for IT governance and management.

The core idea of COBIT 5 is the five principles of IT, and they are (Figure 9):

- **Meeting Stakeholder Needs**: The existence of the enterprise is through the earnings, optimize to maintain a balance between risk and operational resources, so as to create value for its stakeholders. COBIT 5 can provide all the necessary process and other enabler to support the business value creation with the using of IT. Due to the different objectives of every enterprise. The enterprise can develop its own COBIT 5 through goal cascade, translating high-level enterprise goals into manageable, specific, IT-related goals and mapping these to specific processes and practices.

- **Covering the Enterprise End-to-end**: COBIT 5 integrates the IT governance into the enterprise governance. It not only focuses on the

---

IT function, information and related technology is regarded as an asset of the enterprise as the other asset and everyone in the enterprise can deal with them.

- **Applying a Single Integrated Framework**: COBIT 5 keeps highly consistent with other IT related standard and framework, so that it can be the overarching framework for IT governance and management.

- **Enabling a Holistic Approach**: Efficient and effective IT governance and management of the enterprise need a holistic approach should consider the various components interact with each other. COBIT 5 defines a set of enablers to implementation of IT governance and management in the enterprise.

- **Separating Governance From Management**: COBIT 5 makes a clear distinction between governance and management. Governance is the responsibility of the board of directors. Specific governance responsibilities may be delegated to special organizational structures at an appropriate level, particularly in larger, complex enterprises. Management is the responsibility of the executive management under the leadership of the CEO.

With the use of these five principles, the enterprise can build a kind of optimization of information technology (IT) investment and benefit for stakeholders, exceptional governance and management framework.

![Figure 9. Five Principles of COBIT 5;](source: COBIT® 5, 2012 ISACA®)
Through the implementation of COBIT, increased management awareness and support for control. COBIT provides the implementation of the tool set including excellent case information (provide a template for the business process, make good sample quickly to transplant), help to well describe the IT management concept to the management. Management based on the optimal control based on practice ability is also enhanced to make the right decisions. COBIT model, realize the interaction between the enterprise strategy and IT strategy, and from the virtuous cycle of continuous improvement mechanism, provides for the enterprise has a certain reference value for the solution.

The result of implement COBIT methodology in organization is a full understanding of the dependence of the business process with processes implemented in the IT Department. COBIT methodology enables us to develop a coherent strategy and the missions for development of IT department. By implementing COBIT in the organization, introduction good practices in daily management of IT Department becomes also a goal for Managers of enterprise. COBIT is often called from “0 to ∞” methodology, because its main task is to develop groundwork for future changes, models and projects.

### 2.2. ITIL – IT Service Management

IT Service Management is the management of all people, processes and technology that cooperate to ensure the quality of live IT services, according to the levels of service agreed with the customer. It is based on functions such as systems management, network management, application development, and on process domains such as Change Management, Service Level Management and Problem Management.

The essential concept here is “IT service”: the delivery of information processing capabilities to a defined quality (for example, capacity, performance, security, availability, etc.), using a combination of hardware, software, networks, people, documentation and facilities. In practice, we use the term “IT service” at many different levels: not only for the ultimate end user-facing information processing function, but often also for infrastructural systems supporting that service. Full IT services can be subdivided into many contributing components and all of these can be the subject of a specific service organization. But in the end, the only thing that matters is how the integrated functionality is made available to the end user.

To be able to deliver the IT service to the end user, all components need to be managed. ITIL and MOF are two of the frameworks available to
the IT service organization or department aiming for the highest quality at the lowest cost in a turbulent environment. Ultimately, IT Service Management can become a business enabler.

**Introduction of ITIL**

ITIL offers a broad approach to the delivery of quality IT services. ITIL was initially developed in the 1980s and 1990s by the then Central Computer and Telecommunications Agency (CCTA), now the Office of Government Commerce (OGC), under contract to the UK Government. Since then, ITIL has provided not only a best practice-based framework, but also an approach and philosophy shared by the people who work with it in practice.

Information Technology Infrastructure Library (ITIL) defines a guidance of best practice processes; it initially developed in the UK by the Office of Government Commerce (OGC) 1980s. Nowadays, ITIL is becoming a de-facto standard for IT management in organization. ITIL is a framework for IT management in organization. It is used as a guideline for establishing IT service management process. It describes processes, approaches, missions and checklist, to buildup integration with the organizational strategy, delivering and maintaining a minimum level of competency, and it also combines principles, practices and methods.

Although ITIL covers a number of areas, it is mainly focus on identifying best practices in regards to dealing with IT services levels and is particularly process-oriented. In its current vision (known as ITIL 2011 editions), ITIL is published a series of five core volumes:

- **ITIL Service Strategy**: Understanding of organizational goals and customer needs
- **ITIL Service Design**: Combine systems strategy into plans to deliver business objectives
- **ITIL Service Transition**: Develop and improve the capability for introducing new services into supported environment
- **ITIL Service Operation**: Deal with services in supported environments
- **ITIL Continual Service Improvement**: Achieves large scale improvement and services incremental

ITIL provides a fundamental framework for IT governance. The reason why ITIL achieved great success is that it focuses on IT service delivery and continuous quality improvement and evaluation. It provides a complete IT
service life cycle. The initial phase is service strategy to help the organization to determine the purpose of the service. Next is service transition and operation phase. In which the service strategy has been continually implemented. ITIL provides abundant approach for IT management and users can easily implement IT service management in the enterprise.

Figure 10. ITIL Service Lifecycle

The advantages of adopting ITIL in an organization can be summarised as follows:

- Improve customer satisfaction with IT services;
- Improve usability of the IT services, increasing the profit of organization directly;
- Savings due to rework, messy process and waste of time caused financial losses, improve resource management and use;

---

• Improve market-oriented new products and services from the time a market-oriented;
• Improve decision making and optimize risks.

The reason to choose COBIT 5 and ITIL as our research target is the comprehensiveness and operability. As ISACA states, COBIT 5 is the only business framework for the governance and management of enterprise IT. COBIT 5 is built based on COBIT 4.1 and it aborts other major ITG frameworks and standards so that it is a very comprehensive framework to use. Also, in ITIL, there are many best practices that mean they are the confirmed cases and proved to be useful. So that enterprises can choose the similar cases for them to imitate to increase the success rate of the implementation of IT governance.

Due to the rather great deal of discretion in adapting good practices suggested by ITIL, many organizations seek clear guides to answer the question: “What should we implement to ensure that our organization has achieved significant benefits ..?” The answer to this question may be previously mentioned ISO 20000, but the process of certification is quite long, disruptive and expensive. Another way is to use methodologies based on assumptions of IT library (ITIL) such as Microsoft Operations Framework (MOF), which becomes inherent in large organizations during adaptations of ITIL guidelines.

2.3. MOF

Microsoft Operations Framework (MOF) is Microsoft’s structured approach to the same goal (see Figure 11). How to provide the main similarities and differences between both frameworks? The analysis may follow a number of management paradigms that have proven to be essential to IT Service Management:
• Process, People and Technology (PPT)
• Strategy, Tactics and Operations (STO)
• Separation of Duties (SoD)
• Strategic Alignment Model Enhanced (SAME)
• Deming’s Plan-Do-Check-Act (PDCA) Management Cycle.

At the highest level, both frameworks follow a lifecycle approach which contains five elements: Strategy, Design, Transition, Operation, and Continual Improvement, which brings it close to the PDCA model. MOF’s
lifecycle core consists of only three phases: Plan, Deliver, and Operate, with one underlying layer (Manage) to apply to all lifecycle phases.

Both ITIL and MOF use processes and functions as building blocks, although the emphasis differs significantly. ITIL labels most of its components as processes and activities (ITIL has 26 processes and four functions), while MOF is almost entirely based on Service Management Functions (SMFs). Each SMF having a set of key activities for each process. This rigid structure supports consistency throughout the framework. In both frameworks, control of the lifecycle progress runs through a number of transition milestones that have been made very explicit in MOF’s Management Reviews (MRs).

![Microsoft Operations Framework Diagram](https://technet.microsoft.com/library/cc506049.aspx)

**Figure 11. Microsoft Operations Framework**


Both frameworks apply the PDCA improvement approach throughout the lifecycle. MOF, like ITIL, provides a best practice guidance that can be followed in full, but also as a part, to solve local problems. The “ITSM
language” has minor differences between both frameworks, but also a few significant ones. A remarkable difference can be how customer calls are handled: ITIL separates Incident calls from operational service requests and Requests for Change, and MOF combines customer request in a single Customer Service SMF.

There are different role sets and titles largely due to the difference in starting points: ITIL works from the good practices documented in each phase, whereas MOF starts from a structured organization perspective. Another significant differences are in technology. ITIL key feature is vendor agnostic. Its practices can be applied across the board regardless of the underlying technology. ITIL is more focus on the management structure than on the technology. MOF provides a common management framework for Microsoft’s platform products, although it can easily be used for other platforms. ITIL is sold through various channels in five core publications, while MOF is free on the internet in various formats. As a consequence, ITIL copyright is highly protected, whereas Microsoft has made MOF freely accessible for commercial reuse by the Creative Commons Attribution License. Finally, ITIL comprehensive certification scheme is more extensive and it is for professionals. It offers a qualification structure, while Microsoft currently limits its certification to one MOF Foundation examination. There are plans for further certification, but no final decisions have been made.

Both frameworks show plenty of similarities and some specific features. The main focus of ITIL is on the ‘what’, whereas MOF concentrates on the practical side of the ‘what’ and the ‘how’.

**MOF Main structure: IT Service Lifecycle**

The IT Service Lifecycle describes it from planning and optimizing, aligning it with the business strategy, through the design and delivery in conformance with customer requirements, to its ongoing operation and support, delivering it to the user community. Underlying of all of this is a foundation of IT governance, risk and change management, compliance and team organization.

The IT Service Lifecycle of MOF (see Figure 9) is composed of three ongoing phases and one foundational layer that operates throughout all of the other phases:

- **Plan** phase: plan and optimize an IT service strategy in order to support business goals and objectives.
- **Deliver** phase: ensure that IT services are developed effectively, de-
ployed successfully, and ready for Operations.

- **Operate** phase: ensure that IT services are operated, maintained and supported in a way that meets business needs and expectations.

- **Manage** layer: the foundation of the IT Service Lifecycle. This layer is concerned with IT governance, risk, compliance, roles and responsibilities, change management, and configuration. Processes in this layer apply to all phases of the lifecycle.

Each phase of the IT Service Lifecycle contains Service Management Functions (SMFs) that define and structure the processes, people and activities. The SMFs has a few phases, where each one contains a unique set of goals and outcomes supporting the objectives of that phase. Each SMF has three to six key processes. Each SMF process has one to six key activities. Management Reviews (MRs) gather information and people to determine the IT service status and to establish readiness to move forward in the life cycle in each phase. MRs have internal controls to ensure that goals are being achieved and that business value is considered throughout the IT Service Lifecycle.

**Differences between ITIL v3 and MOF v4 frameworks**

Although ITIL and MOF share many values, the two frameworks also show some significant differences:

- **Cost** - ITIL books is sold through various channels and its copyright is highly protected, while MOF is free on the internet and has made it freely accessible for commercial reuse.

- **Development** – in the latest versions of ITIL and MOF spent considerable energy on documenting the development and the adjustment of services. ITIL is reviewed via the Change Control Log where issues and improvements are suggested and then reviewed by the Change Advisory Board. The ITIL Service Design phase concentrates on service design principles, where the Deliver phase in MOF concentrates on the actual development of services. MOF emphasizes the project nature of this phase.

- **Reporting** – ITIL has a specific entity that describes reporting, in the Continual Service Improvement phase, while MOF has integrated reporting as a standard activity in SMFs.
- **Call handling** – ITIL V2 showed a combined handling of incidents and service requests in one process, but in ITIL V3 were turned into two separately treated practices. MOF stays closer to the ITIL V2 practice. If the request involves other service, a separate change process can be triggered.

- **Lifecycle construction** – ITIL uses five elements for its lifecycle: Strategy, Design, Transition, Operation, and Continual Improvement. MOF lifecycle comprises only three phases: Plan, Deliver, Operate, with one underlying layer. In MOF lifecycle practices are applied everywhere, but in ITIL mostly described in one or a few phases. For example, risk management or change and configuration management are throughout the MOF lifecycle but in ITIL these are concentrated in the Transition phase.

- **Organization** – ITIL describes roles and organizational structures in each lifecycle phase. MOF supports best practices by applying the MSF approach: documentation and accountability is explicit, and general rules are allocated to the underlying Manage layer.

- **Governance** – Both frameworks illustrate the difference between governance and management. ITIL describes governance theory and practices in the Strategy phase and in the CSI phase of its lifecycle. It refers to governance requirements in most other phases. MOF explicitly documents responsibility, identifying decision makers and stakeholders, and addressing performance evaluation are in all of its lifecycle phases. MOF specifically addresses risk management and compliance in the Manage layer. Explicit Management Reviews are used throughout the MOF framework as control mechanisms.

### 2.4. Management Paradigms

A number of *management paradigms* have proven to be essential to IT Service Management. These paradigms are used in the comparison of ITIL and MOF.

**People – Process – Technology**

Both ITIL and MOF have a strong focus on processes and they document the activities to cope with problems and tasks. They use the same definition of ‘process’, based on ISO standards. The framework documentation is largely presented in a mix of process, people, and technology, format
of procedures, work instructions and functions. Readers looking for ‘pure process descriptions or process models’ will not find these in ITIL nor in MOF. ITIL uses the term ‘process’ for many of its components but these components are actually functions. MOF uses the term ‘Service Management Function’ throughout the framework.

Organizational structures are documented quite differently. Individual ITIL and MOF roles show some overlap, but they have many unique roles. This is largely based on the difference in viewpoint: ITIL works from its practices towards a detailed roles spectrum and MOF works from a number of basic accountabilities: Support, Operations, Service, Compliance, Architecture, Solutions, and Management. MOF applies the MSF framework as a reference system for these organizational structures, supporting the performance. The team SMF of MOF is explicitly focused on the management of IT staff.

Technology is only covered at an abstract level in ITIL: the framework stays far from commercial products and only describes requirements. MOF, on the other hand, is deeply interwoven with technology solutions but it is not technology-specific. Microsoft technology platform highly aligns with the MOF’s practices. Its site is embedded in the rest of the TechNet documentation on Microsoft products. Paradigm for defining the core focus areas in managing organizational improvement is Process – People – Technology (PPT) (see Figure 3). These three areas should be addressed when using IT Service Management frameworks. Consequence of applying this paradigm is the separation of functions from processes.

The ITIL Glossary defines a process as “a structured set of activities designed to accomplish a specific objective. A process takes one or more defined inputs and turns them into defined outputs. A process may include any of the roles, responsibilities, tools and management controls required to reliably deliver the outputs. A process may define policies, standards, guidelines, activities, and work instructions if they are needed.”

MOF defines a process as interrelated tasks that, taken together, produce a defined, desired result. A function according to ITIL is “team or group of people and the tools they use to carry out one or more processes or activities. For example the Service Desk.” So a function is an organizational capability, a combination of people, processes (activities) and technology, specialized and responsible for specific work and end results. Functions use processes. MOF defines the term service management function (SMF) as a core part of MOF that provides operational guidance for Microsoft information
technology applications. SMFs help organizations to achieve mission-critical system reliability, availability, supportability and manageability of IT solutions.

**Strategy – Tactics – Operations**

A second important and widely applied approach to the management of organizations is the paradigm of Strategy – Tactics – Operations (STO); see Figure 12. At a strategic level an organization manages its long-term objectives in terms of identity, value, relations, choices and preconditions. Goals on the tactical level are controlled and directed but on operational level they are translated into action plans and realized.

**Strategic levels** are covered in both frameworks. ITIL documents its best practices on long-term decisions. But MOF does the very same in the Plan phase, and supports this in the Manage layer.

**Tactical levels** are covered in a similar way: ITIL concentrates these in the Service Design and CSI phase, and MOF describes its tactical guidance in the Deliver phase, in the Manage layer and in the Operate phase (Problem Management).

**Operational levels** are covered mainly in a single phase in both frameworks; ITIL has its Service Operation phase, and MOF has its Operate phase.
Separation of Duties

Information processing systems have only one goal: to support the primary business processes of the customer organization. Applying the widely accepted control mechanism of Separation of Duties (SoD; see Figure 13), also known as Separation of Control (SoC), we find a domain where information system functionality is specified (Information Management), and another domain where these specifications are realized (Technology Management). The output realized by the Technology Management domain is the operational IT service used by the customer in the business domain.

![Figure 13. Separation of Duties control mechanism](image)

The Strategic Alignment Model Enhanced

The combination of STO and SoD delivers a very practical blueprint of responsibility domains for the management of organizations: the **Strategic Alignment Model Enhanced**.

It provides excellent services in comparing the positions of management frameworks, and in discussions on the allocation of responsibilities. It is used by universities, consultants and practitioners.

Applying MOF and ITIL

Both ITIL and MOF advocate the use of elements of the framework if the full set is too much for an organization. Training on ITIL starts with the
lifecycle, then in to the framework components. MOF offers its guidance on the TechNet website and access to the framework. In practice, very few organizations apply the full guidance of either framework. Most often, organizations start out with those components that address the biggest problems. This is no different for ITIL or MOF. Among the most popular content we can find the guidance on change and configuration, on Incident restoration/customer service support, on Service Level Management/business-IT alignment, and on Problem Management.

Published case material proves the value of implementing ITIL or MOF is extremely rare. Business cases mostly involve factors such as quality improvement – a rather intangible factor. Nevertheless, implementations of framework components can often be based on a Business Case approach. Measuring initial state performance metrics and comparing these to the situation after implementation then can support the adoption of additional components of the framework.

Both ITIL and MOF are reference frameworks and not implementation models. The documented best practices can be used within an organization and provided their own developed process or use an out-of-the-box model to support organization and technology dimensions.

When redesigning an organization, using ITIL or MOF and following the People – Process – Technology paradigm, a process model would be the start where organizations should decide on what to do, decide on who they need for the job, and equip the organization to achieve goals. Although you would expect processes to be standardized throughout the IT services industry, standardized pure process models are rarely available in the market. In most organizations, the people dimension is unique, just like the technology dimension: most organizations differ in structure, culture, behavior and history, and the supporting technology comes in many forms. This way, each implementation project is influenced by a unique combination of local factors, and on top of that we rarely find any greenfield situations.

Given this situation, MOF supports implementation projects by making the framework components available in standardized structures, allowing implementation managers to pick the required components and add these to the scope of their specific project. The structure of the framework furthermore aligns firmly to common project management standards, allowing for an easy fit. Implementing MOF is supported by ongoing evolution of MOF guidance, and by the support of the online MOF community at the TechNet website. These two methods are used every day in the work of IT departments.
Their assumptions are based on appropriate work department as well as the organization and delivery of IT services. For a modern organization concept, Services becomes the main principium. These methods also referred to as methodologies from 1 to ∞, that is, from the appearance of the product or service in the process until it is removed. Therefore, we see a strong emphasis on the life cycle of the product or service in the organization. Although these methods are not used to produce new products that they constitute a natural link project teams with the processes of the organization’s management.
To develop of a new product or service in controlled way we must selected appropriate management methodologies and it requires adoption of management methods integrated with the organization of governance. In the case of large projects (especially governmental or administrative) IT organizations decide to use PRINCE2 methodology. It is compatible with the ISO 9000 and ISO 9001 so it is an ideal link a method of developing products.

3.1. PRINCE2:2009

The pace of change is increasing and it is brought about by funding constraints, new market opportunities, altered policies and regulations or continuous improvement. Nowadays senior management expects rapid results and succinct delivery from change projects. There is pressure to deliver more for less in a shorter time period to optimize the delivery. This has given rise to shorter, lower-cost projects designed to achieve ‘fit for purpose’ solutions focus on results and benefits. This type of project still needs to be managed, however; utilizing PRINCE2 without effective tailoring could prove too onerous for this scale of project. The increased awareness of project management in IT has encouraged organizations to classify a wide range of business change initiatives. Inevitably, included in these will be far more small-scale projects than large. Even those organizations that have embarked on ‘transformation’ programs also have a need for a simple-to-use approach to the myriad of (typically small) delivery projects that are used to implement the strategic changes the program is designed to bring about. Most of the new projects are small and have a low risk. In this case project management might not require the full application of PRINCE2 to manage them. These individuals will probably not have the experience or knowledge to be able to tailor PRINCE2 to their projects. This could lead to an ad-hoc approach to small projects, with potentially poor outcomes.
Since PRINCE2 there has been an increase awareness of best practice and professional skills of project management. Organizations and Project Managers still wish to use a best practice approach, but also wish a pragmatic, consistent, light-touch means for their smaller projects. A key benefit of PRINCE2 is to simplify the project lifecycle to achieve the business benefits within the identified constraints. PRINCE2 has been designed to be easily tailored; however, it can be a difficult solution for organizations without the required project management expertise. Therefore, there appears to be a market need for a best practice project management approach that would help organizations manage their smaller projects based on the excellent tailoring guidance spread throughout PRINCE2. Within the business change community there is an acceptance of the portfolio, program and project structure as defined by OGC in the Portfolio, Program and Project Management Maturity Model (P3M3®). It is important that any light-touch application of PRINCE2 fits within this structure and is able either to be used as a standalone approach to project management or to link with Managing Successful Programs (MSP®) and Management of Portfolios (MoP™) to provide a coherent best practice structure.

PRINCE2 has often been seen as a bureaucratic or only applicable to large-scale projects. Even when PRINCE2 was revised in 2009, it was not provided detailed guidance for the project manager whose running small projects. One of the PRINCE2’s key drivers has been simplify for small projects so those who running them are not burdened with the same rigor as for larger projects. Most organizations who have adopted PRINCE2 have tailored the method to suit their business and would place over half of their projects by number into the small projects category. PRINCE2 popularity emerged an issue that the word ‘project’ is often used for a piece of work that does not need to be set up and run as a project. This has caused project overload in some organizations. The PRINCE2 principles are the guiding obligations for good practice that project should follow if it is using PRINCE2. These are derived from lessons, both good and bad, that have affected project success. The principles provide a framework of good practice for those people involved in a project – ensuring that the method is not applied in an overly prescriptive way or in name only, but applied in a way sufficient to contribute to the success of the project. The list of PRINCE2 principles is presented below:

- **Continued business justification** - PRINCE2 project has continued business justification,
- **Learn from experience** - PRINCE2 project teams learn from previous
experience (lessons are sought, recorded and acted upon throughout the life of the project),

- **Defined roles and responsibilities** - PRINCE2 project has defined and agreed roles and responsibilities with an organizational structure that engages the business, user and supplier stakeholder interests,

- **Manage by stages** - PRINCE2 project is planned, monitored and controlled on a stage-by-stage basis,

- **Manage by exception** - PRINCE2 project has defined tolerances for each project objective to establish limits of delegated authority,

- **Focus on products** - PRINCE2 project focuses on the definition and delivery of products, in particular their quality requirements,

- **Tailor to suit the project environment** - PRINCE2 is tailored to suit the project’s size, environment, complexity, importance, capability and risk.

PRINCE2 introduces the 7 major themes responsible for the efficient ecosystem management project. The PRINCE2 themes are those aspects of project management that need to be addressed continually throughout the project lifecycle (i.e. not once only). They provide guidance on how the process should be performed. For example, numerous processes in PRINCE2 involve creating or approving plans and explanatory guidance on this can be found in the plans theme.

The set of PRINCE2 themes describes:

- How baselines for benefits, risks, scope, quality, cost and time are established (in the Business Case, quality and plans themes);

- How the project management team monitors and controls the work as the project progresses (in the progress, quality, change and risk themes).

The organization theme supports the other themes with a structure of roles and responsibilities with clear paths for delegation and escalation. Major 7 themes are presented in Table 2.

**Table 2. Major 7 themes of PRINCE2**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Questions answered by the theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Case</td>
<td>Why?</td>
</tr>
<tr>
<td>Organization</td>
<td>Who?</td>
</tr>
<tr>
<td>Quality</td>
<td>What?</td>
</tr>
</tbody>
</table>
PRINCE2 provides a process model that consists of a set of activities that are required to direct, manage and deliver a project. The following figure (Fig. 14) shows the main processes of PRINCE2.

The main PRINCE2 processes are:

**Starting up a Project** - Covers the pre-project activities required to commission the project and to gain commitment from corporate or program management to invest in project initiation, by answering the question: ‘Do we have a viable and worthwhile project?’

**Directing a Project** - Describes the Project Board’s activities in exercising overall project control. The activities focus on the decision making necessary for Project Board members to fulfil their accountabilities successfully while delegating the day-to-day management of the project to the Project Manager.

**Initiating a Project** - Describes the activities the Project Manager must lead in order to establish the project on a sound foundation. Every PRINCE2 project has an initiation stage. The key deliverable from this stage is the Project Initiation Documentation, which includes an overall Project...
Plan and defines baselines for the six project performance targets of time, cost, quality, scope, risk and benefits.

**Managing a Stage Boundary** - Describes the activities the Project Manager must undertake to provide the Project Board with sufficient information to enable it to review the success of the current stage, approve the next Stage Plan, review the updated Project Plan and confirm continued business justification and acceptability of the risks.

**Controlling a Stage** - Describes how the Project Manager manages the project execution/delivery activity during a stage, and reports progress and exceptions to the Project Board.

**Managing Product Delivery** - Addresses the Team Manager’s role in supervising the detailed work of creating the project’s products and provides the link between the Project Manager and the teams undertaking the project work.

**Closing a Project** - Describes the closure activity towards the end of the final stage of the project. The Project Manager leads the process which provides for an orderly decommissioning, including any remaining project acceptance and handover requirements.

Tailoring refers to the measures taken to apply the method properly to an individual project, ensuring that the amount of governance, planning and control is appropriate – neither too burdensome for a simple project nor too informal for a large or complex project. The adoption of PRINCE2 across an organization is known as embedding. The differences between Tailoring and Embedding are presented in table 3.

**Table 3. The differences between Tailoring and Embedding**

<table>
<thead>
<tr>
<th><strong>Embedding</strong> (done by the organization to adopt PRINCE2)</th>
<th><strong>Tailoring</strong> (done by the project management team to adapt the method to the context of a specific project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on:</td>
<td>Focus on:</td>
</tr>
<tr>
<td>• Process responsibilities</td>
<td>• Adapting the themes (through the strategies and controls)</td>
</tr>
<tr>
<td>• Scaling rules/guidance (e.g. score card)</td>
<td>• Incorporating specific terms/language</td>
</tr>
<tr>
<td>• Standards (templates, definitions)</td>
<td>• Revising the Product Descriptions for the management products</td>
</tr>
<tr>
<td>• Training and development</td>
<td>• Revising the role descriptions for the PRINCE2 project roles</td>
</tr>
<tr>
<td>• Integration with business processes</td>
<td>• Adjusting the processes to match the above.</td>
</tr>
<tr>
<td>• Tools</td>
<td></td>
</tr>
<tr>
<td>• Process assurance.</td>
<td></td>
</tr>
</tbody>
</table>
PRINCE2 methodology is characterized by relatively low elasticity, therefore in situations of rapidly changing conditions could lead to downtime in implementing the project. In many cases, PRINCE2 approach gives very good results, especially in Government projects, but private organizations often seek a more tailored solution.

Corporations and private companies are more interested in a methodology developed by the Project Management Institute (PMI) and formalized as a set of principles of project management tools named Project Management Body of Knowledge (PMBoK). The main benefits for organizations that using PMBoK is greater than the PRINCE2 flexibility, goal-orientation and strong cooperation with the project team.

### 3.2. Project Management Book of Knowledge (PMBoK) ver. 5

PMBoK is a *de facto* standard, which means that it is a set of well-established procedures, which are not formally defined. It is a worldwide standard of American professional associations and PMI is the most widely used standard in the field of project management, which is generally recognized as good practice. Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management has successfully implemented the individual processes that receive inputs and generate outputs, while using the knowledge, skills, tools and techniques of project management. PMBOK gives us the information needed to establish, planned, carried out, monitored and controlled, and finish the project. This does not mean that it should describe the knowledge, skills and processes in every project used the same way. For each project, the project manager works in collaboration with the project team to determine which process will be used and to determine the degree of importance. The characteristic of project management in companies is continuously improving the functioning of processes and learning for the future. The objective is to not behave like a closed system, but to be open to new matters and enable knowledge base for future projects that build on existing knowledge in the field of project management. This means in practice keeping the good practice and getting rid of the bad.

The standard describes the nature of project management processes in terms of the integration between the processes, interactions and their
intentions. Individual processes are classified into five categories, called process groups of project management:

- The group the setup process,
- Group planning processes,
- A group of processes of implementation,
- Group process monitoring and control,
- The completion of group processes.

According to PMBoK standard, each project consists of five groups of processes, regardless of the scope or industry. The processes are performed iteratively until the project is brought to the end. Main process map is presented on Figure 15.

Figure 15. Main PMBok Process Model
Source: PMI PMBoK 5 edition.

All five groups of processes are very much related to the areas of knowledge of project management, which will be presented below. Each knowledge base is present in several processes, that take place in several groups of processes. Links between areas of knowledge and groups processes can be seen in the following table. Individual processes are marked with numbers make it easier to follow the document below. For each process, the main resources and results are indicated, since such transitions are easier to create for these products between processes. If the results of the process are shown in one of the previous iterations, it means that it is an updated document.
### Table 4. PMBOK® Guide Knowledge Areas and the five PMBOK® Guide Process Groups

<table>
<thead>
<tr>
<th>Knowledge Area Processes</th>
<th>Groups of project management processes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initiating</td>
<td>Planning</td>
</tr>
<tr>
<td>Integration</td>
<td>Develop Project Charter</td>
<td>Develop Project Management Plan</td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td>Plan Scope Management Collect Requirements Define Scope Create WBS</td>
</tr>
<tr>
<td>Time</td>
<td>Plan Schedule Management Define Activities Sequence Activities Estimate Activity Resources Estimate Activity Durations Develop Schedule</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Plan Cost Management Estimate Costs Determine Budget</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Plan Quality Management</td>
<td>Perform Quality Assurance</td>
</tr>
<tr>
<td>Human Resource</td>
<td>Plan Human Resource Management</td>
<td>Acquire Project Team Develop Project Team Manage Project Team</td>
</tr>
<tr>
<td>Communications</td>
<td>Plan Communications Management</td>
<td>Manage Communications</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Risk</td>
<td>Plan Risk Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify Risks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perform Qualitative Risk Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perform Quantitative Risk Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plan Risk Responses</td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td>Plan Procurement Management</td>
<td>Conduct Procurements</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Identify Stakeholders</td>
<td>Manage Stakeholder Engagement</td>
</tr>
<tr>
<td></td>
<td>Plan Stakeholder Management</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3. Comparison of PMBok and PRINCE2:2009

On the Internet, a large number of comparisons between the two systems PMBOK and PRINCE2 can be found. Below we present a study, whose author is Max Wideman. Max Wideman is a member of the American Association of PMI and is one of the pioneers of Sciences, project management and is one of the authors who participated in the issue of previous versions of the PMBOK-standard for PMI.

PRINCE2 does not start looking for solutions and examining enforceability. This is provided as input to the project cycle. The life of the project describes it as a puzzle in five phases: concept, feasibility, construction, operation and closure. PRINCE2 covers only part of the realization, construction management from the other side is not interested. PRINCE2 provides for implementation within the contracts. It is proposed that the management of contracts and procuring special activity that can be managed separately, also using the PRINCE2 methodology. In PMBOK finding solutions and consider the enforceability of the first phase of the project. Manage supplying project is part of the process of project management within the project.
According to the PRINCE2 methodology, leadership consists of the software world, project world, project manager and team leader. The PMBOK does not represent so-defined roles and gives more freedom in this area.

PRINCE2 analyzes in detail all the individuals and grants them the responsibility. In PMBOK-standard for the of human resources, project leader is described as the individual responsible for the overall management of the project.

PRINCE2 describes the project manager as a person with a certain degree of power, which is responsible for managing on a daily basis. All major decisions require approval by the Project Board. PRINCE2 has many specific management functions, which are not found in the PMBOK standard. The example could be the project office, which is responsible for coordination and support for the project. We will also won’t find the Project Board, which covers executive, user provisioning and management of the project and superior project manager.

PRINCE2 devotes more attention to the project documentation. It assumes that introductory document, called the mandate, must be approved by management. From it, the document on the study of business viability is obtained. PMBOK is not aware of such documents. When setting up a document that defines the output of the process of setting up the project, the PMBOK uses the term project charter. In both cases, documents hold responsible what, when, how and why to work in the project. In general, it provides a much larger number of documents. Most important, in the PMBOK we will not find the acceptance criteria, the list of contentious issues and a list of risks which are specific records given their descriptions, analysis, measurement and condition. Planning is presented in the PMBOK as a managerial skill and is one of the five groups of project management processes. It appears in every field of knowledge and runs through the entire lifecycle of the product. It is presented in the “Management Integration Project” section. The essence of the production is a consistent and easily understandable document that will guide the execution of the project and is the basis for the management of change.

PRINCE2 highlights product planning where the planning focuses on the product, its production and quality. It gives us a logical sequence of project work. It specifies three planning techniques: making structural diagram articles, writing a description of the product and manufacturing network diagram products.
These management methods have performed very well in managing “stable” projects such as the implementation of IT systems, construction datacenter or construction of motorways (though this last example in Poland may be not the best). However, they may underperform in allowing the generation of new software or conducting research projects. In such cases, the flexibility of the team and the ability to implement changes without having to modify the objectives of the project is what counts most. In the case of such projects, the productive and adaptive methodology could be implemented, that is called Agile Methodology.
4. Manufacturing methodologies - the productive and the adaptive

Marek Pyka

Preparation of new software, web sites or research an innovative product requires a change in the approach to project assumptions and the role of the Project Manager. Unlike the management methodologies, flexibility of the team and capability to adapt to ever-changing customer objectives becomes a major determinant of productive and adaptive methodologies. Of course, these methods differ in the level of flexibility and scope of the project management principles. Among them there are more and less agile methodologies. Depending on the size of the project, typically it uses the following methods:

- Projects development and researched in large companies: here, very often IBM methodology Rational Unified Process (RUP) or the Microsoft Solution Framework (MSF) are used;
- Project development and research in smaller teams: here reign agile methodologies such as Agile Project Management (APM), eXtreme Programming or SCRUM. There are numerous ways for a software development organization to create an information technology solution for the customer.

All go through a multistep procedure from analysis of the system requirements through design, implementation and completion. An organization can just start building the solution without stable fundament, or use their own well thought-out step-by-step procedure, but the most proper way is to use a well-known successful software engineering process. A software engineering process is a roadmap for a clear and safe journey to the IT-salvation of the customer. It helps project teams address the most common causes of technology project failure in order to improve success rate, solutions quality, business impact and create a meaningful business solutions which meets the needs of the customer. An organization has the evaluate their conditions of guidance, because there are a lot of software engineering process created in time, each with its own mindset, steps and structure.
4.1. Rational Unified Process methodology

Rational Unified Process (RUP) is a methodology focused on creating a high quality software projects which have to be done in some predefined period of time, by the means of certain amount of money and have to be compatible with the specified user requirements. RUP exactly defines who is responsible for what, when and how different activities should be done. It also provides well specified structure of the project development lifecycle. This methodology suggests to follow some practices of project’s documentation. As a result a huge amount of documentation is created, but such well documented process helps in projects management and leading of an unexperienced team. The basic characteristics that describe the Rational Unified Process are listed below.

• It is architecture oriented. Architecture is the basic element of the process based on RUP which is analyzed, constructed and managed. Planning and team management is a frequent activity as the constructing system is divided into subsystems and layers, and all those parts demand their separate control. The architecture also points which elements of the developing system are reusable or which are third party elements.

• RUP defines an iterative development process what means it is divided into series of iterations. During each iteration, activities belonging to many disciplines are executed. The scope of those activities depends on the project development phase and the project’s current stage. Iterativity has many advantages in front of the classical development process.
  ○ The final product quality is high because of executing different types of tests at the end of each iteration. Also the iterative process gives the possibility to capture new requirements more precisely and validate implemented functionality against those already existing.
  ○ Relatively quick problems detection gives the possibility to take some preventing actions in case of those emergency situations.
  ○ Constant integration helps to avoid time consuming integration process which regarding the classical model is executed at the end of system development. Here the integration process takes place at the end of each iteration integrating newly created components with those previously implemented.
  ○ Thanks to iterativity, the reusable elements can be easily identified because of taking advantage of already captured require-
ments and already implemented functionality from the previous iterations.

- RUP is use case driven. Use cases describe the system functionality from the user’s point of view. Their description is understandable as well for the team of developers, as for the client side. Use cases are easily traceable in different kind of models, user requirements and artifacts such as system prototype or tests. Use cases establish the base for the development process.

RUP defines the complete development process from user requirements elicitation to the product deployment end-user environment. RUP divides the work to activities which are thematically classified to disciplines and it defines roles to which the particular activities are assigned. Activities from different disciplines can be performed simultaneously. RUP also introduces such concepts as an iteration and a phase and indicates which are the process input and output artifacts. The following subsections describe in more detail the RUP work breakdown structure, in particular two disciplines

The RUP methodology defines an iterative model of software development that is classified into four phases: Inception, Elaboration, Construction, and Transition, which constitute the principal stages of the software development. Each phase is supported by the product generated in the previous phase. Phase’s result can be either a document, a piece of code of implementation or other artifact important for the software project development process. A short description of each of the phases is as follows:

- **Inception** - this phase focuses on the description of the project scope and understanding of the general project’s goal and requirements.

- **Elaboration** - focuses on the requirements, its understanding and use as a technical specification. Architectural solution is designed and implemented in the form of a prototype. This phase also covers tasks of technologies and tools investigation for the project’s purpose.

- **Construction** - focuses on the implementation and testing of all the components and features described in the specification. One of the most important management tasks in this phase is the control of resources, costs, schedules and the quality of produced software.

- **Transition** - focuses on applying created software in the real life environment by the end users. This phase considers that the created software moves by parts to the user waiting for the acceptance, and giving feedback to developers about found problems and errors which leads to releasing new software versions.
RUP organizes its thematically related activities into disciplines. A discipline describes an area of concern within the methodology. RUP defines 9 disciplines which are divided into 2 groups of core and supporting disciplines. The RUP disciplines are listed on the diagram below (Fig. 16).

**Figure 16. The RUP disciplines**

In Core Process Disciplines, following processes are realized:

- **Business Modeling** - The purpose of this discipline is to understand the structure, business processes, the problems, and to identify potential improvement possibilities of the given organization. The processes, roles and responsibilities are defined in a model of the business based on the Vision artifact. The business models show the structure and dynamics to ensure that all stakeholders have the same understanding of the given organization.

- **Requirements** - The activity in the requirements discipline establishes and maintains agreement with the customers and other stakeholders on the system capabilities, user-interface and user needs. It provides the project team a better understanding of the system requirements and boundaries. The artifacts in this discipline are a basis for planning the technical content of iterations and estimating cost and time to develop the system. The requirements discipline describes how to create the
Vision artifact and how to interpret it into a use-case model. The use-case model and the supplementary specifications define the detailed software requirements of the system.

- **Analysis and design** - The analysis & design discipline translate the requirements into a detailed description to implement the future system. To be able to make this translation, one has to understand the system’s requirements and transform them into a system design by identifying the best implementation strategy. A mandatory robust architecture is the fundament for the Design Model artifact in the analysis and design discipline. The analysis part translates the system’s functional requirements to a set of classes and subsystems based on the use-cases. This Analysis Model is a rough sketch of the system and has to be refined and evolve to be able to implement the system-to-be. In the design part of the discipline, the Analysis Model is expanded into its refinement, which is the Design Mode. It consists of a set of collaborations of model elements, e.g. use cases that describe the behavior of the system. The design model is the essential input artifact for the activities in the implementation and test disciplines. The Analyze & Design discipline links the requirements and the actual implementation of the solution by creating a Design Model artifact.

- **Implementation** - The activities of the implementation discipline imply the definition of a mutual arrangement of subsystems organized in layers to implement the classes and objects in components. The finished components are unit-tested and improved until they have an acceptable level of quality to be integrated into an executable system. The iterations of the RUP enable the integration of components in an evolutionary approach throughout the system’s lifecycle.

- **Test** - The previous discipline has unit-tested the individual components and has integrated them into the system. This discipline examines the system as a whole, to assess the product quality. It provides the project with a feedback mechanism to measure quality and identify defects so the team members can improve the quality of the solution. The test includes verifying the completeness and correctness of the implemented requirements, the integration and interaction of components in the system, and conforming that all defects are addressed before the system is deployed. Testing occurs in all phases of the RUP to enable continuously feedback, to improve the product as it is designed and built.

- **Deployment** - The deployment discipline embraces all the artifacts
that are delivered to the end-users or customers. It includes activities like beta testing, distributing, installing, creating of a deployable package of the solution and, if necessary, migrate the product with the existing software or convert the legacy database. Additional, this discipline prescribes the project team to write a users’ manual and train them on how to use the software.

Other activities are included in the Process Core Supporting Disciplines. They are:

- **Configuration and Change management** - The purpose of the configuration & change management discipline is to track and maintain the integrity of evolving project assets as well as configuration and change management environment. During the software development life cycle many labor-intensive artifacts are produces, which must be traceable, available for reuse and updated regularly in order to progressive understanding and change requests. These different versions of artifacts must be controlled and traced to keep track of its location and history to know what was the reason and who was responsible for changing the artifact. It is important for the project team to understand the current state of the artifacts and the whole solution.

- **Project Management** - A healthy software project has a balance of contradictive objectives, managing risks and defeating constraints to deliver a product that meets the needs of the customers and the end-users. Project manager plans the software development life cycle in two ways. One, he generally plans the process as a whole in iterations to monitor the progress of an iterative project. Two, he plans the next iteration with a risk-driver approach in detail. This balance is created by the project management discipline by providing the project with a framework for managing software-intensive projects and risk management, practical guidelines for planning, staffing, executing, and monitoring projects.

- **Environment** - The purpose of this discipline is to support the project organization with both processes and tools. It establishes an environment where the right tools, acquisition and process are available and well configured to suite the organization. It is also responsible for the technical services to support the process, like the IT-infrastructure, account administration and regularly backup. In other words, the activities in the environment discipline provide the project environment with the correct tools, processes, and methods.
The IBM Rational Unified process is an iterative software engineering process, which ensures the production of quality software that meets the needs of its end-users, within a predictable schedule and budget. RUP consists of ten essentials and six best practices to express the beliefs of the IBM Rational iterative software development mindset. The process itself is arranged in phases and iterations, which segments the process in time, and disciplines, roles, workflows, activities, and artifacts which divides the work of the process. The RUP is a formal and heavy software engineering process that focuses on time and budget planning, to be a predictive process, and uses iterations to cope with changes that are in line with the scope of the project throughout the software development life cycle.

4.2. Microsoft Solutions Framework (MSF)

Microsoft Solutions Framework (MSF) is a set of software engineering processes, principles, and proven practices that enable developers to achieve success in the software development life cycle (SDLC). MSF provides an adaptable guidance, based upon experiences and best practices from inside and outside of Microsoft, to increase the chance of successful deliverance of information technology solution to the customer by working fast, decreasing the number of people on the project team, averting risk, while enabling high quality results. MSF 4.0 provides a higher-level framework of guidance and principles which can be mapped to a variety of prescriptive process templates. It is structured in both descriptive and prescriptive methodologies. The descriptive component is called the MSF 4.0 metamodel, which is a theoretical description of the SDLC best practices for creating SDLC methodologies. Microsoft is of the opinion that organizations have diverging dynamics and contrarily priorities during their software development; some organizations need a responsively and adaptable software development environment, if others need a standardized, repeatable and more controlled environment. To fulfill these needs, Microsoft represent the metamodel of MSF 4.0 in two prescriptive methodology templates that provide specific process guidance, named Microsoft Solutions Framework for Agile Software Development (MSF4ASD) and Microsoft Solutions Framework for Capability Maturity Model Integration Process Improvement (MSF4CMMI). Note that, these software engineering processes can be modified and customized to the preferences of organization, customer and project team. The MSF 4.0 process are illustrated on following picture (Fig. 17).
The MSF philosophy holds that there is no single structure or process that optimally applies to the requirements and environments for all sorts of projects. Therefore MSF supports multiple process approaches, so it can be adapted to support any project, regardless of size or complexity. This flexibility means that it can support a wide degree of variation in the implementation of software engineering processes while retaining a set of core principles and mindsets. The Microsoft Solutions Framework Process Model consists of series of short development cycles and iterations. This model embraces rapid iterative development with continuous learning and refinement, due to progressive understanding of the business and project of the stakeholders. Identifying requirements, product development, and testing occur in overlapping iterations resulting in incremental completion to ensure a flow of value of the project. Each iteration has a different focus and result in a stable portion of the overall system.

Figure 17. MSF processes

Microsoft Solution Framework version 4.0 has the seven foundational principles which are commonly used by developers and managers and are generally recognized as common-sense elements for software development project. They form the basis of the MSF software engineering process to organizing people and processes. The principles are:

- **Partner with customers** - a key success factor is to know the real stakeholders business value of the solution. Communicating and inter-
acting with the customer identifies this business surplus value. Regular meetings and evaluations between the project members and the customer make sure that this value is kept in mind and that the solution evolves to the expectation of the customer.

- **Foster open communications** - information concerning the project has to be shared with all members of the team to create a complete and optimal project environment. Each team member has his own quality, ability and vision to the solution; and by sharing this information reduces the chances of different visions of the solution and ensures that all members can contribute knowledge to decrease project uncertainty and to create a better solution. Communication between all stakeholders is the medium through which a shared vision and performance objectives can be defined, measured, and achieved.

- **Work toward a shared vision** - all stakeholders have to participate in the creation of a shared vision to ensure that everyone understand and emphasize the same goals and ideas of the end-solution. Through shaping the vision collectively, all stakeholders’ opinions are considered, so the project decisions are not arbitrary. The vision statement has to be clear and elevating, so it gives the project a more secure environment. Without a shared vision, stakeholders may have conflicting ideas or views of the goals, value and outcome of the project, that which may results in an unsatisfying and unwanted solution.

- **Quality is everyone’s job every day** - the quality of the solution is a responsibility of all participants. For instance team members perform both bug prevention and solution verification to assure that the project has the required quality level. By preventing and correcting measures flaws can be determined and fixed early in software development life cycle to reduce the costs of patching up and to keep a high quality level of the system.

- **Stay agile, adapt to change** - The current information technology is rapidly changing and becoming more innovative to explore new grounds and opportunities. These new grounds bring along more uncertainty in the development project. The bigger and more innovative a system is, the more uncertainties the development project has during the system development life cycle. These uncertainties push the project in a situation where establishing the conditions and constraints *a priori* is hard to do.

- **Make deployment a habit - do.** Nowadays, to define all the requirements and constraints of a project in advanced becomes unrealistic as
well as demanding certainty in a changing environment. Therefore, project members need to expect changes during the lifecycle.

- **Flow of value** - The project should be planned and executed to create a flow of value. Every step and activity is scheduled based on the delivery of increasing value to the customer and prioritized in the order of adding business value in the solution. Activities that do not add a customer value have to be minimized. This principle of prioritize and incremental development ensures that every step has a positive effect to the customer value and return on investment of the project.

Microsoft Solutions Framework for Agile Software Development is a scenario-driven by directly incorporating practices for handling quality of service requirements such as performance and security. MSF4ASD is also context-based and uses a context-driven approach to determine how to operate the project and help to create an adaptive process that has the ability to cope with a changing environment. The process of MSF4ASD is composed of tracks, advocacy groups and cycles. The tracks are the time phases of the process and lead to governance checkpoints that creates go/no go moments in the project. The seven advocacy groups of the MSF team model are groups of combined work actions that are related to each other. A visually depiction of the process gives one a clear overview about the SEP. MSF4ASD did not have a graphical representation of its process, like RUP does. Therefore we conducted a graphical representation of Microsoft Solutions Framework for Agile Software Development as shown on following picture (Fig. 18).
The Microsoft Solutions Framework for Agile Software Development is one of the two software engineering processes of the Microsoft Solutions Framework. This process is a very adaptive. It guides the software development team during the implementation of an IT-solution with an ad hoc planning and development mindset. MSF4ASD consists of foundation principles and a team model to grow an agile mindset within the project development team. The process itself is arranged in tracks and cycles to segment the process in time, and advocacy groups, roles, work streams and work items to divide the process suitable small work tasks. The MSF4ASD is an informal, ad hoc, and responsive software engineering process that focuses less on time and budget planning, but more on a perfect end result and coping with changes.

RUP and MSF4ASD guide the project team in creating a solution that meets the needs plus expectations of the customer to satisfy the stakeholders. To reach this goal the two software engineering processes have common grounds and differences, in the field of the philosophy, focus in time and work division. RUP wants to identify the requirements early in the process to be able to focus on time and budget planning to create a predictive development environment. MSF4ASD embraces ad hoc requirements management to facilitate the project team with the ability to cope with changes to create
an adaptive and responsive environment. As mentioned above, these methods are used by large organizations for the preparation of complex systems and applications. An example would be the MSF used by Microsoft to produce Windows software. For smaller projects or external customers, whose knowledge of the purpose and objectives of the project crystallized many times during its implementation uses agile methodologies.

4.3. Agile Project Management and SCRUM

Agile Project Management is a new initiative which extracts the Project Management elements. This enables experienced Project Managers to adopt a mature, scalable corporate-strength Agile approach within their organizations. On a traditional project, the Project Manager may be actively involved in directing work and telling their team what needs to be done – a style often referred to as Command and Control. Agile PM follows a different style. In the early stages, the Agile PM creates a high level plan, based on outline requirements and a high level view of the solution to be created. From that point onwards the end project is created iteratively and incrementally, with each increment building on the output of increments preceding it. Unlike a traditional project, the detailed plans for each step are created by the team members themselves and not the Project Manager. Within each stage of the project the team works in an iterative and incremental style in close collaboration with a representative of the business/customer in order to understand the detail of the next step and to create and validate an evolving solution.

Agile Project Management comprises established and proven components that provide a holistic approach to the management and governance of projects. It has an overarching philosophy and guiding principles, together with a lifecycle (or process) and a set of deliverables to be created and maintained as the project progresses from a controlled start through to completion. It provides clearly defined roles with specific responsibilities designed to bring together all stakeholders involved in the project.

In the Agile world, there are a number of approaches available; the most common of these are eXtreme Programming (XP), SCRUM and Lean. To put these Agile approaches into context:

**XP (eXtreme Programming)** – focusing on I.T. development, XP provides developer techniques and practices such as Pair Programming, Continuous
Integration etc. There is no concept of a Project in XP, and with the exception of planning, little guidance around management, since the primary purpose of XP is to provide Agile delivery techniques. Typically where XP is to be used to deliver Agile Projects, it is often combined with other Agile approaches which add-on the Project and Management elements.

**Scrum** - provides an excellent team-based approach to allow work to be prioritized and delivered, using the concept of a constantly evolving “backlog” to provide the team’s workload. Scrum’s simplicity is its strength, and since it is so easy to describe and to start to use, this has driven its popularity to date. To IT projects, Scrum is often paired with XP, with Scrum providing the team management process and XP providing the developer techniques.

**Lean** – an approach which is originated in the Toyota manufacturing environment in the 1940s. Its main principle is “Eliminate Waste” – it drives work to be done in an efficient way. In practice, this means avoiding anything that does not produce value for the customer. Examples of Lean thinking are “don’t do all the detailed analysis up front, because it will change/ some will not be progressed to delivery” and “test throughout, then you don’t waste time working on things that do not fit the business”. A lean approach can be applied at development level, but it is also often used at the organizational level.

Organizations seeking to adopt an Agile approach are sometimes concerned about some of the messages and myths of Agile, and it can be very difficult to separate rumor from fact. For example, some Agile approaches suggest that Project Management is irrelevant or unnecessary – a very worrying message for organizations that rely on their project managers, and organizations that may have invested heavily in creating a pool of experienced and accredited Project Managers. This has led some to an incorrect perception, that Agile is only applicable for small, simple pieces of work, and that organizations would need to choose either Agile or formal project management and corporate processes. However, this perception is incorrect. One advantage of Agile Project Management for the organization is that they can adopt an Agile approach that has a track record of successful management and delivery in the corporate environment, and an approach that complements and works with existing corporate processes, such as PRINCE2, quality and audit processes, etc.

**SCRUM methodology**

*Scrum* is originally a Rugby-term, describing the position in which a game is restarted after an infringement. It was first used (in modern context)
in the now famous analogy by Hirotaka Takeuchi and Ikujiro Nonaka. Their article “The New Product Development Game” compared management of product development to the game of Rugby and highlighted some traits which are now very much at the center of modern agile methodologies. The Scrum process was then formalized and introduced into software development by Sutherland and Schwaber⁹, culminating in the Scrum Methodology. Scrum is built on the same principles that make up the Agile Manifesto, namely:

**Individuals and interactions over processes and tools** - Scrum does not say that processes and tools are not important, but rather that individuals and interactions are more so. Processes and tools are there to support them, but it’s the right people, talking to each other, working as a team that makes things happen.

**Working software over comprehensive documentation** - “Software” here can stand for any product (outcome) from the project. Documentation in a project is important for several reasons. In a large project or projects that span over a long time, people working on the project come and go. In order for knowledge to survive and be retrievable later, documentation is clearly needed. However, the primary objective of the project is to have an acceptable product as outcome, and this should be prioritized. The best is to find a good balance between getting it done and writing it down.

**Customer collaboration over contract negotiation** - A contract is an agreement between you and the customer/client over what (and sometimes how) something will be done, how much it will cost etc. The contract is typically signed in the beginning, before all details are clear. Scrum recognizes the problems this causes, and focuses on solving problems and making the customer happy, rather than fighting over what was initially agreed.

**Responding to change over following a plan** - Planning is essential to knowing what to do next, but to follow the initial plan blindly when requirements and needs change makes no sense. In Scrum planning is done in iterations, as more and more information is known.

Traditional project management methodologies like PRINCE2 are mostly process driven, and approach process control in a “defined” way, e.g. they try to define the exact input and output for each process from the start, and hold on to this. The process outcome can be evaluated at times, and if needed, the process will be re-defined, setting new inputs and outputs. Scrum instead utilizes empirical process control (Scrum Methodology. Has Scrum Become

---

the Face of Agile?, http://scrummethodology.com/has-scrumbecome-the-face-of-agile). Here the process itself is monitored constantly, and if found lacking is adjusted as soon as possible. The iterative, short time frame approach of Scrum (e.g. deliver working prototype every x weeks) makes it possible to adjust the process while the project is on-going, and base these process adjustments on what has actually been done. Below is a figure depicting the Scrum process (the iteration time is just a suggestion; it can be longer but preferably shorter than 30 days). Each iteration is called a **Sprint**.

**Sprint** is the basic unit of development in scrum that is, restricted to a specific duration. The duration is fixed in advance for each sprint and is normally between one week and one month, with two weeks being the most common.10

Sprint starts with a sprint planning process, where the work for the sprint is identified and an estimated commitment for goal is made. On the end of each sprint the sprint review is made. Team reviewed the progress is reviewed and shown it to stakeholders. After review, the next sprints are identified and described.

![Figure 19. The Core Scrum Process](image)

Figure 19 shows the main components of Scrum. The Product Backlog is a list of items (business requirements, functionality and features) that lives

---


---

during the project. The priority of the items is decided by the Product Owner. The Sprint Backlog is the list of items to be implemented in the current iteration (Sprint). The items are divided up into tasks, and in theory anyone can choose any of the tasks, providing their skill level is adequate. The Daily Scrum meeting is re-occurring during the whole Sprint, and is a good process control point. There is also a Sprint Burndown Chart, which can be a simple diagram and shows how much work remains to be done. Except for the Daily Scrum, the following Scrum meetings are also an integral part of the Scrum process: Sprint Planning Meeting, Sprint Review Meeting and Sprint Retrospective.

In Scrum there are 3 main roles. The Product Owner defines and prioritizes the items for the Product Backlog and has the power to accept or reject the outcome. Through this, he is responsible for the business result of the project. The Scrum Master has a team lead role, and is responsible for helping and supporting the team, rather than controlling what they do. Finally, the Team are the people who make things happen. The team is small, cross functional and self-organizing. There are also other roles which might have some involvement in the project, but which are not formally part of the Scrum process. However in Scrum, there is no concept of a project, simply a Product Backlog of work to be done. For those wishing to scale Scrum to work as a corporate-wide Agile approach, or to use it for management of projects and releases, there is usually significant extra work needed to overlay the project/release concept onto the basic Scrum process. Scrum does offer a very simple version of corporate-wide Scrum (referred to as “Scrum of Scrums”), but in the complex corporate world, there is little confidence in the successful practical application of this. The end result is often that complex organizations using Scrum, but needing a corporate-strength Agile approach, end up re-inventing the information and guidance already available in other frameworks.

### 4.4. Comparison of Traditional and Agile Project Management

The main differences between Traditional and Agile project management methodologies are presented in table 5.
Table 5. The main differences between Traditional and Agile project management methodologies

<table>
<thead>
<tr>
<th>Principles and Context</th>
<th>Traditional Project Management</th>
<th>Agile Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principles</strong></td>
<td>Project scope is known in advance and will not change significantly</td>
<td>Complete project scope is not known at start and will evolve during the project</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Events affecting the project are predictable</td>
<td>Unpredictable events may affect the project</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Processes must be well defined, repeatable and their execution rigidly controlled</td>
<td>Processes must be lightweight and easily adaptable to</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Origin and Theory</th>
<th>Scientific Management</th>
<th>Adaptive management and chaos management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Management</strong></td>
<td>Process based approach</td>
<td>Iterative approach</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focus</th>
<th>Quality</th>
<th>People and teamwork</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost/Earned value</strong></td>
<td>Planning/timing</td>
<td>Customer value</td>
</tr>
<tr>
<td><strong>Planning/timing</strong></td>
<td></td>
<td>Execution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key characteristics</th>
<th>Full in-depth upfront planning</th>
<th>Incremental refinement and re-planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continuous command and control</strong></td>
<td>Self-organizing expert teams</td>
<td>Flat hierarchy</td>
</tr>
<tr>
<td><strong>Management by Exception</strong></td>
<td>Active client participation</td>
<td></td>
</tr>
<tr>
<td><strong>Formal hierarchy</strong></td>
<td>Disciplined adherence to processes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key strengths</th>
<th>Controls scope creep through rigid control over requirements</th>
<th>Thrives in dynamic environments with strong client participation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strongly emphasizes and controls the quality of deliverables</strong></td>
<td>Very reactive to changes</td>
<td>Very reactive to changes</td>
</tr>
<tr>
<td><strong>Deviations in terms of cost or planning are detected in an early stage</strong></td>
<td>Strong team involvement and collaboration</td>
<td>Strong team involvement and collaboration</td>
</tr>
<tr>
<td><strong>Easily teachable and repeatable</strong></td>
<td>Improved customer satisfaction and team motivation</td>
<td>Improved customer satisfaction and team motivation</td>
</tr>
<tr>
<td><strong>Efficient monitoring and resource control through incremental project lifecycle</strong></td>
<td>Quick and easy to learn</td>
<td>Quick and easy to learn</td>
</tr>
</tbody>
</table>

**Key strengths**

- Thrives in dynamic environments with strong client participation
- Very reactive to changes
- Strong team involvement and collaboration
- Improved customer satisfaction and team motivation
- Quick and easy to learn
- Low start-up time
<table>
<thead>
<tr>
<th>Traditional Project Management</th>
<th>Agile Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key weaknesses</strong></td>
<td></td>
</tr>
<tr>
<td>Poorly suited to dynamic and</td>
<td>Susceptible to scope creep</td>
</tr>
<tr>
<td>uncertain project environments</td>
<td>as clients have the luxury of</td>
</tr>
<tr>
<td>Any changes in the later project</td>
<td>changing requirements on an</td>
</tr>
<tr>
<td>stages may have a significant impact on the overall project</td>
<td>on-going basis</td>
</tr>
<tr>
<td>Initial plan often falls quickly out</td>
<td>Overall cost and planning cannot be determined upfront</td>
</tr>
<tr>
<td>of touch with reality and requires constant revision</td>
<td>Less efficient for large teams due to daily stand-ups</td>
</tr>
<tr>
<td>Inappropriate for small projects due to overhead of formal deliverables</td>
<td>Not usable for fixed price projects</td>
</tr>
<tr>
<td>Less frequent interaction with stakeholders</td>
<td></td>
</tr>
</tbody>
</table>

**Differences between RUP and SCRUM methodologies**

Both methodologies are considered to be Agile and approach project activities in the iterative way. However, RUP methodology calls for a formal definition of scope and major project milestones are associated with specific dates. SCRUM methodology uses project backlog instead of scope and allows the backlog to be redefined at the end of each iteration (usually about every 4 weeks). In addition, RUP subdivides the project lifecycle into 4 major phases (Inception, Elaboration, Construction, and Transition). Even though it encourages concurrent workflows across the entire cycle, the general understanding is that certain activities will peak during certain phases (for instance, requirements analysis will spike during the elaboration phase). On the contrary, SCRUM dictates that the entire “traditional” lifecycle fits into one iteration. In other words, a workload for one iteration at a time is determined and then the entire cycle occurs within one iteration (e.g. the requirements for a particular feature are collected, documented as a user story, then coded, tested and presented for the user review).
MANUFACTURING METHODOLOGIES - THE PRODUCTIVE AND THE ADAPTIVE

Table 6. RUP vs. SCRUM Comparison

<table>
<thead>
<tr>
<th></th>
<th>RUP</th>
<th>SCRUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Iterative</td>
<td>Iterative</td>
</tr>
<tr>
<td>Cycle</td>
<td>Formal Cycle is defined across 4 phases, but some workflows can be concurrent.</td>
<td>Each sprint (iteration) is a complete cycle.</td>
</tr>
<tr>
<td>Planning</td>
<td>Formal project plan, associated with multiple iterations, is used. The plan is end-date driven and also has intermediate milestones.</td>
<td>No end-to-end project plan. Each next iteration plan is determined at the end of the current iteration (NOT end-date driven). Product Owner (Key Business User) determines when the project is done.</td>
</tr>
<tr>
<td>Scope</td>
<td>Scope is predefined ahead of the project start and documented in the Scope document. Scope can be revised during the project, as requirements are being clarified, but these revisions are subject to a strictly controlled procedure.</td>
<td>Instead of scope, SCRUM uses a Project Backlog, which is re-evaluated at the end of each iteration (sprint).</td>
</tr>
<tr>
<td>Artifacts</td>
<td>Vision/Scope Document, Formal functional requirements package, system architecture document, development plan, test plan, test scripts, etc.</td>
<td>The only formal artifact is the operational software.</td>
</tr>
<tr>
<td>Type of Project/Product</td>
<td>Recommended for large, long-term, enterprise-level projects with medium-to-high complexity.</td>
<td>Recommended for quick enhancements and organizations that are not dependent on a deadline.</td>
</tr>
</tbody>
</table>

4.5. Project Management hybrid methodology.

Case study

World of project management would be more predictable if we could create a magic matrix that describes the type of project and relevant project management methodology. Unfortunately, in many cases Project Managers are forced to create different kinds of hybrids with adaptation of relevant methodology to implement at a particular project stage, task or team. This phenomenon for many years was changing the education process of Project Managers. At present intended that a good Project Manager has its leading management methodology which enables it to quickly integrate the processes
of strategic management and one or more manufacturing methodologies that enabling appropriate to organize task forces.

Practical experience shows that the same organizations also tend to create various types of hybrid solutions that enable organizations to implement the best mechanisms created in various management methodologies. Different methodologies are not mutually exclusive, because each focuses on a different area of operations. Their combinations can build a very efficient project management ecosystems. Based on organizational methodologies, we can get a benefit from the experience held by the organization in the definition of goals and objectives. Flexible adaptation to Governance management methodology enables organizations to formalize the decision-making processes and controls necessary for the proper functioning of the project in an organization. Proper selection and adaptive manufacturing methodologies guarantees the efficient production of products. Each of the types of methodologies is common steps that will allow a flexible combination of them together. There are many examples of the positive combination of the RUP methodology PRINCE2 or PMI or APM PMBoK with SCRUM.

One example of such an approach has been applied in the implementation of large Private Cloud environment for a large financial institution.

**Organization of strategic management level**

During the project implementation of Private Cloud environment, followed by a number of points of interconnection between building services and existing organization governance. For this reason, at the stage of determining the project objectives have been involved many client’s business departments. Such a considerable involvement and the scope of affecting business services require a very large involvement of representatives of most senior managers. To enable them to actively participate in the creation and implementation of the project, the organization decided to appoint a well-known with the PRINCE2 methodology of the Project board.

**Role of Project Board**

*Project Board* - This is a committee that is responsible to the high management of the company or program for the overall direction and strategic management of the project. In the Project has authority to decision-making and possibility for the project within the limits of posting them (within the commission a project) by the company management or program. Project Board contacted on behalf of the project with the external environment and
is responsible for the promotion of the project or other type of dissemination of information about him. As part of the work Project Board also operated to controlling processes in the project, business risk management and controlling of the Business Case for managed project.

**Business case** – presents an optimal set of information used the purpose of formulating an opinion on the business reasonableness of the project. Answers the question whether the project is (and still remains) a beneficial, workable and still needed for organization, so if it’s worth it continues to lead and bear the costs associated with it.

**Determining if project management provides value to an organization**

Despite the abundant research conducted across many industries and countries, there was no definitive answer as to the actual benefits an organization could reap by implementing project management. Thomas and Mullaly in a book “Exploring the dynamics of value and fit: Insights from project management therefore” investigated whether an organization could receive added value by implementing these techniques. This multimillion dollar project took more than three years to complete and combined the results of case studies, surveys and interviews, to provide an extensive review of project management value. In addition to establishing that project management can indeed add value to an organization, one of the results that emerged from this study describes the balance between cost and value creation when project management techniques are implemented.

This finding, as depicted in Figure 20, shows that at a certain point the law of diminishing returns comes into effect. As the total investment in project management practices is increased, the results show ever smaller increases in total value gained. Therefore once the perfect balance has been achieved, it becomes illogical for the organization to invest more resources into improving project management practices. Thus each organization needs to establish the correct balance of procedures and methods to manage projects in their environment.
Furthermore, the optimum investment for project management was shown to be unique to each organization. What may be optimal for one organization may not necessarily be applicable to another, even if the organizations are of similar size and operating in the same industry. This research highlights the important role that the project manager must play in determining the correct method and amount of project management for a particular organization. Additionally, once the project manager arrives at a decision for the type of project management style they will implement, further adaptation must occur per project, as even at the project level there is a broad range of difference between project types in the same organization. Once again the requirement for flexibility and resourcefulness on the part of the project manager is made apparent.

**Project Management level**

The specifics of the project and the involvement of multiple stakeholders (external and internal) forced the project team to select the PMI PMBoK methodology as a standard which the management tasks were carried out. The scope of the project included a lot of infrastructure tasks, implementation but also quite an important group of programming tasks. Since organization had no clearly defined assumptions about the layers of Self-Service for Cloud Computing Services, it was necessary to introduce additional methods specific for this type of projects. Accordingly, the organization decided to
use in the manufacture of the code and the project of new service models for implementation SCUM methodology. Specific intervals approach for this methodology has been already integrated with the Initialization process and Planning PMBoK methodology. At the stage of preparing the Charter Project, it began work related to the concept of scope and assumptions. At this stage, was put a very large emphasis on the development of “user stories”, whose job was to collect the necessary information about the target of the solutions of Self-Service. By using the same assumptions, it started the implementation series of workshops, which aim was gather the information necessary to design new waveforms for Cloud Computing Services. These two areas of the project tasks were implemented in accordance with the assumptions of the SCRUM methodology.

**Product development level**

Implementation of the project and products manufacture was carried out in two ways. Tasks related to form necessary for Cloud Computing infrastructure are managed in line with the PMBoK methodology while programming tasks and design services based on SCRUM and the concept of sprint.

In the closing phase of the project have been developed test scenarios, which presented the functionality of the built environment. Also, at this stage it was integrated into the three methodologies. From the point of view of PRINCE2 methodology, the Project Closing process with process control has been introduced, according to PMBoK functional and user tests were carried out, and according to SCRUM methodology process of sprints stabilizing was introduced. Hybrid solution is presented on figure 21.

![Figure 21. Hybrid solutions for integrating PRINCE2, PMBoK and SCRUM methodologies](image-url)
This project was a success, but it should be noted that it was characterized by very high communication and management problems. The variety of methodologies is always a cause of conflicts and problems with the scheduling of the project. Collected during this project experience will allow a project manager and the whole organization more efficient implementation of future projects.

4.6. Summary

The variety of project management methodologies gives organizations a wide range of solutions enabling the production of new products and services. But bear in mind that the launch of the first project will forever change management processes within the organization and adopted governance (Governance). Achieving success in managing the organization is dependent on the level of awareness on the layer of Strategic Management. Well-designed foundation for managing the organization (IT) can result in a high probability of successful completion of projects and the efficient management and maintenance of manufactured products. Remember that the Project Management processes are implemented by organizing a consequence of organizational methodologies and a strong understanding of the business objectives of the organization.
5. IT project management in outsourcing environment

Bogumila Krzeszowska-Zakrzewska, Grzegorz Zakrzewski

As business continues to grow and develop, it has to adapt in ever-changing world. Outsourcing became an important approach to adapt to those changes. It is an essential strategy to remain competitive on the international market. Also, outsourcing represents an important opportunity for economic advancement and entry into the global economy.

There are many reasons for outsourcing. The turbulent market requires from companies to be customer focused, there is a pressure to develop new products and to reduce costs. Moreover, market needs from companies to be flexible and adaptable with IT-enables processes. Even if outsourcing in many cases is enforced by market, companies can benefit from it in many ways. The direct benefit from outsourcing is related to employee’s performance. External service providers can perform some activities more efficiently, so the quality of performing activity will improve and cost will decrease. Other benefits are related to both cost and effort to perform not core activities, like trainings, assets, materials and infrastructure.

In this situation with such big pressure from the market and with so many benefits, outsourcing services will grow in the nearest future, what is also confirmed by the research presented further in this chapter.

Outsourcing as an activity can be studied in many ways. Here, in Poland, it is important because the country is becoming the major leader in terms of advanced services which of course includes project management services. Poland has an opportunity to become a leader in this sector especially as a main destination for the world key players to outsourced or offshore their business. So the economic perspectives are very important, but the scope of this book will not allow for further investigation on this perspective. Here, outsourcing will be described from the perspective of project management, as it is the leading subject of this book.

Nowadays, project manager is the term very widely used, especially in the IT environment. The project managers are expected to deal with projects
and project team in outsourcing environment. In means that project managers have to work with virtual teams instead of collocated teams. The most important skills in dealing with virtual teams will be investigated.

5.1. Outsourcing

What is outsourcing

Outsourcing can be defined as the transfer of responsibility\textsuperscript{11}. In outsourcing, customer asks vendor to perform a given task. The vendor assumes the responsibility of having that task completed according to guidelines and expectations. The idea of outsourcing raised from assumption that any organization or any person is an expert in all tasks. There are rather some core areas in which business tends to specialize\textsuperscript{12}. The more time company can spent on core functions, the better those tasks are performed and more competitive organization can become. However, companies still have to spend some time on activities which are important from their point of view — such as accounting functions related to taxes. Moreover, company may not be a specialist in this area. In this context, if an organization outsources those activities to then it has more time to focus on the core operations. In summary, organizations tend to use outsourcing for two reasons: expertise and time.

Of course, companies may decide to outsource from many reasons. They want to focus on their core activities and outsource those for which do not have unique capabilities (specialization). It is called strategic outsourcing and results for companies in maximizing competitiveness and expanding market share. Furthermore, extracting maximum benefits from internal activities, decreasing risk and reducing the time of fulfilling customer needs. Decision about outsourced services to external provider are either organizationally, financially or improvement driven.

As we can read in the EU report about outsourcing in Europe in 2014 (survey conducted among companies from 8 European countries – about 3700 respondents), the most important reasons for outsourcing are: improvement or reduction in cost level, efficiency improvements, improved focus on core


business, reduction in headcount objectives and access to specific knowledge, expertise and tools.

**Types of outsourcing**

In the last 10 years, outsourcing has evolved into specific disciplines related to IT work and knowledge activities. We can divide outsourcing to the following subdivisions:

- **Business Process Outsourcing (BPO)** – It is a situation in which a company has a vendor, who is performing particular business service (knowledge based service, e.g. payroll processing). It is including standard business services associated with worker maintenance.

- **Application Outsourcing (AO)** – It is a process of creating and deploying and managing software product to meet specific needs of the customer.

- **Infrastructure Outsourcing (IO)** – It is a situation in which a company has a vendor, who is providing hardware, software and support needed for customer to have IT infrastructure in the organization.

- **Knowledge Process Outsourcing (KPO)** - It is a situation in which a company has a vendor, who performs skilled knowledge-based tasks that result in the production of a unique knowledge product or that requires unique/situation-specific results related to a particular field (e.g. legal services or market analytic).

In the literature we can also find few more distinguishing outsourcing types: Total Outsourcing, Total Insourcing, Selective Outsourcing and De Facto Outsourcing (Insourcing) or distinguish into six types: Offshore Outsourcing, Business Process Outsourcing, Business Transformational Outsourcing, Retro-sourcing and Rural-sourcing.

In Total Outsourcing at least 80% of services is transferred to the external service provider, while in Total Insourcing at least 80% of services

---


remain internal, after evaluation of the market of external service providers. Selective Outsourcing assumes that only some services will be outsourced to the external service provider and about 20-80% of service will be delivered internally. De Facto Outsourcing assumes exclusive use of internal resources for some services. This decision arises from historical reasons rather than evaluation of the market of external services providers.

Offshore Outsourcing is a situation in which service provision and management is transferred outside of the organization’s home country.

Business Process Outsourcing assumes to transfer to external services provider selected areas of repeated business processes, e.g. financial statement analysis.

Business Transformational Outsourcing is a relationship which involved both Information Technology Outsourcing and Business Process Outsourcing. This type of outsourcing is utilized to share risks in innovating, gain strategic competitive advantage to enhance business performance.

Retro-sourcing is a cyclic relationship in which offshore service provider outsources some degree of services back to the client organization’s home country. It results in job creation.

Rural-sourcing is a form of Outsourcing, in which services is transferred to rural regions of the client organization’s home country. In this type of outsourcing jobs retain onshore while benefiting rural communities what benefits in a positive public image of the company. It is expected to be an increasingly viable alternative to Offshore Outsourcing.

**Advantages and risks of outsourcing**

There are many advantages of outsourcing, but it is important to be aware outsourcing can also cause some risks for the company.

The main advantage of outsourcing is cost reduction. Companies which keep their services internally may incur in research, development, deployment costs. Those costs may cause that their overall competitive advantage will be smaller. By outsourcing their services to an external service providers operational costs can be reduced, so some funds will be freed and used in other, strategically important, areas. Typical cost reductions are in the region of 20% to 40%, mostly in labor costs\(^{19}\), but in some literature we can find that cost reduction can be even up to 70%\(^{20}\).

---

External providers are gaining expertise by working with multiple customers. They are making technological and human resources investments. Choosing world-class service provider, who has experience with cutting-edge technologies and skills, enables access to world-class capabilities and specialist resources. It can reduce the technology obsolescence risk.

Outsourcing allows to focus on core business and transferring service to external provider. Company can choose a variety of services from leading external providers. It enables to optimize company’s value chain and focus resources on main business objectives.

Outsourcing can be also viable option in the situation when company has problems with internal resources. As some of existing workload can be transferred into external provider, internal resources can be allocated to perform activities important to reach business and strategic objectives. As in the case of other advantages of outsourcing this also will result in higher efficiency and competitive advantage.

Risks are inherent to almost any business decision\(^2\). Being aware of all risks, which can be caused by technical, financial, economical or political issues can be costly for the company. Thanks to outsourcing companies can have better risk management (comparing to internal handling) in terms of exploiting resources and specialist expertise.

As mentioned previously outsourcing can also bring some risk for the company. One of the biggest risk for company is loss of its informal knowledge. As outsourcing is often connected with human resources transfer, company’s internal expertise is reduced. In this situation also a level of company’s dependence from external service providers is rising. Company should carefully validate the impact of transferring competencies to identify resources which should remain in the company for required skill sets.

Other, very important risk, is reduction in quality of service received by client. The quality of the service can be lower due to contract agreement that may fall below the levels previously agreed. Companies have to be able to evaluate performance of outsourced services and effectively use Service Level Agreements.

The main advantage of outsourcing was cost reduction, but on the other side we have a risk of cost escalation. This cost escalation may occur from

unforeseen expenses, which overrun those originally contracted. This risk can be mitigated by proper financial analysis before outsourcing and by proper statements in Service Level Agreements. Service Level Agreements should clearly indicate what the financial basis and conditions of the outsourcing are.

As we can find in the literature and from companies’ experience, which already have implemented outsourcing, we can distinguish key factors for successful and unsuccessful outsourcing.

The key factor for successful outsourcing is understanding of goals and objectives of outsourcing implementation (it has to clearly state, why company decided to outsource services and what company wants to achieve). Together with understating the goals it is important to have a plan, which defines how outsourcing will support strategic objectives of the company. Management level of the company has to support such initiative and be actively involved in decision making. Decision about service outsourcing to external provider supposed to be supported with financial justification. There are many aspects, which needs to be taken into consideration when deciding about outsourcing, like: legal, financial, economical, technological and organizational aspects. When decision about outsourcing is made careful selection of service provider needs to be performed. Provider with the best capabilities should be chosen. Also in this process careful analysis is required. It is important to specify in the agreement with external service provider quantifiable performance monitoring. Objectives and measurable methods should be clearly specified. This can reduce the risk of disputes in relation to SLA’s. Constant monitoring and management of all aspects of the lifecycle of outsourcing should be put in place. After external provider is chosen it is important to conduct open communication and consultation with all affected individuals and groups, like employees and trade unions.

The main factors for unsuccessful outsourcing are: company’s motivation for outsourcing are short-term benefits instead of strategic opportunity, lack of defined processes for incident and change management, lack of decisional authority and experience od management team, service provider reporting only positive results in the decision making process, lack of comprehensive evaluation of external service providers prior to selection.
5.2. Market of outsourcing services

As results of “Deloitte’s 2014 Global Outsourcing and Insourcing survey” state outsourcing market is growing and will be growing in the nearest future. Customers are now focusing on optimizing vendor relationships and to expand their own flexibility. So far, increase in market of outsourcing services have been driven by service in such areas like: Information Technology, Human Resources, Finance and Accounting and Procurement. Customer growth in those areas will likely continue. Meanwhile, we can expect a growth in additional functions like: Facilities Management, Legal Process Outsourcing and vertical BPO like claims and Mortgage Processing. Moreover, outsourcing will evolve in terms of geographical locations as customers are looking to expand from mature markets like India, China, and Eastern Europe to new locations in South America.

We can consider three key elements which drive outsourcing growth;

- Technology - Innovations and technological advancements like: cloud computing, big data, mobility or business process as a service support outsourcing growth. Customers are expecting to have high quality content and service in real time meanwhile those technologies are having immediate impact on it.
- Location strategy – India is still primary location for offshore. In addition customers are continuing to look for opportunities in: Poland, Philippines and China and looking for new opportunities in countries like: Brazil or Mexico.
- Legislation and regulation – Relaxation of regulations of employment in Europe and Middle East and Africa is expected to lead to outsourcing growth, but data privacy regulations may reduce the use of outsourcing globally.

According to technology as a driver for outsourcing over 50% of companies, which took part in the survey stated that cloud computing, business process as service, hosted virtual desktop, big data and mobility will increase outsourcing market (Figures 22 and 23).
Figure 22. Technologies which will impact outsourcing decisions
Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey

According to the countries to which services are outsourced India is still a leader, but as we can see the planned growth in relation to offshoring and outsourcing activities in Poland is bigger than in India (additionally Poland is only European country here) (Figure 24).

Figure 23. Current outsourced services and services planned to be outsourced
Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey
Figure 24. Countries for offshoring and outsourcing activities
Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey

Strong position of Poland on the market of offshoring and outsourcing activities is also underlined in other report.

As stated in the Deloitte’s survey, Poland is becoming the major leader in terms of advanced services which of course is including project management services. Poland has an opportunity to become a leader in this sector especially as a main destination for the world key players to outsourced or offshore their business.

At the moment Poland has around 160 000 people working in more than one hundred centers supporting customers around the world. The latest research indicates that Poland has very large growth potential in this area and within next 10 years this numbers can even growth to half a million individuals if driven correctly and supported by the macro environment.

This of course will result in the increased number of individuals which will raise in the skills area like management capabilities, leadership, communication and multicultural team management over the dispersed teams which is the core of project management toolset.

Poland is already growing faster in this sector then other CEE countries as well as India, which so far was regarded as the center of outsourcing world (Figure 25).
Figure 25. The growth of outsourcing world

The big part of this growth is in IT sector where project management competency is such a crucial thing. Another important factor in favor of Poland is still competitive cost compare to Western countries (but as well CEE once), as well as quality, which is regardly better than in India.

Another advantage especially as far as project management is concerned, is the similar time zone for most of the stakeholders, which in terms of project management, as a discipline based on communication, is very important. This is not a kind of job which can be carried on when everyone is sleeping, especially when we are talking about the projects in global environment.

Furthermore, Poland as a location is well connected with other European countries and within few hours either by using plane or other means of transport one can reach major business centers like London, Berlin or Paris. This is again a huge advantage, as even though we are speaking about project management in the offshoring/dispersed model, we cannot forget that fact that face interaction is key to success in project management, especially in
initiation and planning phases where workshop are being held to address how the things should be run and then executed in the future.

Additionally, travelling UE citizens people do not require (most of the time) special work permits or visas (Austria seems to be an exception since beginning of 2015) which is not a case in terms of Asian nationals, where this kind of documents are mandatory.

This is all going in line with the global demand for the project managers around the world (not only in the IT sector). According to the PMI organization\(^\text{22}\) the demand for project managers around the world by 2020 will reach around 15,7 million (and we are talking here about new jobs opening only – not the existing one in total) which is only showing us how the current business world is hungry for these types of skills. The main growth will be in “Project – intensive industries”, which are the industries with high level of project-oriented work like: manufacturing, business services, finance & insurance, oil & gas, construction, utilities and of course described here IT sector.

The growth in demand for project management professionals with be in line with growth of GDP of the same project-intensive industries, as well as salary increase in those sectors.

Here are also some additional numbers to be taken into consideration from PMI report to see how flourishing this area will be. In 10 countries with established or quickly growing project management industries, project management roles are going to increase over 13,4 million between 2010 – 2020.

China and India supposed to lead the growth of those numbers but no one would be surprised if in the leading position right afterwards or maybe even between CEE countries will take their position as the leader for providing project management services.

One of the biggest companies as showed on the diagram below are the companies from IT sector which is showing the potential of enormous growth of outsourcing project management activities as it would not be both possible and affordable to get all these resources in the given country.

\(^{22}\) Project Management Talent Gap Report – PMI.
Figure 26. PMI demographic – seven project-intensive industries

As presented on Figure 26, the biggest players are companies from information services sector like IBM; AT&T; Google and others, which is showing the right direction for growth of project management skills.

5.3. IT outsourcing project management

Project of IT outsourcing implementation
As stated by Amant, outsourcing should be implemented in 6 stages:
1. IT Strategy Preparation
2. Resource Planning
3. Requirements Analysis
4. ITT or RFS process
5. Contract Negotiation
6. Implementation

IT Strategy Preparation is the initial stage of outsourcing implementation. In this stage business objective and IT strategy should be developed. IT functions should be reviewed to determine what are outsourcing candidates. An evaluation is needed to identify the mission-critical applications for strategic retention, and the level of internal expertise required to prevent loss of organizational competencies, and hence safeguard against lock-in risks. Also legal feasibility of outsourcing needs to be considered during this phase.

The second stage of outsourcing implementation is resource planning. In this stage resources – equipment and people, required for maintaining in-house functions needs to be identified. Those resources need to be analyzed to identify resources for streamlining or elimination. Also topic related to human resources issues should be identified and considered in this stage.

Requirements Analysis is next step in outsourcing implementation project. It is the most important part of such project. If requirements are defined in unappropriated way it can result in implementation delay, resources waste, client dissatisfaction and in some cases also in financial loses. The analysis of requirements should start with gathering business requirements, which should be translated into performance requirements of functions to be outsourced.

When requirements regarding outsourcing are clear request for proposal (RFS) or invitation to tender (ITT) stage should start. In the ITT/ RFS document the scope of the functions to be outsourced needs to be described, key and general requirements as also detailed function requirements. Companies taking part in this process should be informed what information are required from them to deliver. It is easier to compare companies between them, if they provide required information in the same way.

On the basis of the result of ITT/RFS stage few service providers are selected and invited to the next step, which is contract negotiation. There are some service provision issues which should be discussed during this stage, like: performance standards, technological review, change management, compliance and penalties for non-compliance. Acceptance testing should be a part of contract. It helps to endure that customer`s requirements were met.

The last step is implementation. This stage contain the establishment of monitoring and ascertaining the compliance of performance standards in the service provision. Outsourcing requires considerable time commitment and should be integrated with the strategy of the company. As outsourcing is a potentially long-term commitment, relationship based in trust among company and service provider should be built. Even in environment full of trust
a formal procedures to resolve issues should be developed. Up to six weeks after implementation feedback loop between customer and service provider should be established.
6. Project manager in IT outsourcing project

Bogumila Krzeszowska-Zakrzewska, Grzegorz Zakrzewski

Nowadays, project manager is the term very widely used, especially in the IT environment. The project management activities can be very different from what can be found in the books under the project management terminology. Project management toolset contains activities like: coordination of tasks, resources, purchasing, licensing, processes and even ongoing operations. For each of these activities company requires a job role which in most cases would be called project manager or project coordinator.

As we are talking about IT projects in the outsourcing environment, let’s try to define first what would be the main characteristic of good project manager in such an environment.

At the beginning we can start with doing some categories of IT project managers by:

1. Previous background
2. Specialization

In terms of previous background we are talking about two cases. The first one is project manager who were starting as an IT specialist (engineers) or programmers. These people have a range of medium to high technical knowledge in one or most of the areas with the spark of leadership and coordination skills. These are very good potential for project managers (remember that project management is not a discipline which can be learn like coding or programming – most of the time it must come with experience).

The second type of project managers will be people coming as a project managers from the different business area with already project management experience in the different field.

The second split will be by specialization. We can have project managers which are specializing in one group of IT projects like software rollout or data center migration. These individuals will have a deep knowledge in the area in which they are specializing. The other type of project managers would
be the ones which are jumping from project to project and from one area to another to get new experience and get knowledge of new technologies.

It is hard to say which type of project manager is better as this is mostly depend on the company profile and the types of projects which the company is managing. The important thing is to understand that with the current demand for IT project managers for sure is that the companies need to avoid the stereotype that a project manager must be an expert in the specific field. This simply would not be possible and the companies needs to look broader and be able to use existing skills both internally within the company and externally from the market to fulfill their open roles for project managers.

The next important question would be which skills IT project manager should have to deliver the expected results. Typically these skills would not different vary from any other project management skills and nowadays there is a clear direction that companies are rather seeking in the first place for the mixture of soft skills plus project management experience rather than deep technical expertise in the certain technical domain. As indicate by the chart below leadership comes as a first one due to the fact that project manager is expected to drive things and deliver the results. This statement is getting extra focus when this is coming to disperse teams which are natural part of outsourcing project management environment.

![Figure 27. PMI pulse – navigating complexity](image-url)
Let’s us also take a look about the leadership aspect from the theory point of view.

There are many leadership styles in literature and many names which can be use to describe it. Most of them describe the same phenomenon of managing people from the point where we are taking full leadership to the point where leadership is delegated and leader is only observing. These are two extremes and the other leadership styles are somewhere between. Regardless the names and styles leadership in all aspects is someone influences to drive other to achieve specific goals either for organization or individual.

Here, both transactional and transformational styles are described as they are good reflection of styles using in corporation and are giving clear correlation with performance.

According to literature, researches were conducted where authors clearly linked both mentioned leadership styles with both employee commitment and organizational performance. Transformational leadership was identified as crucial for team cohesion and efficacy whilst transactional as a key factor to improve actual tasks performance and gain extra effort24.

Concept of transformational leadership was introduced in 1978 by James McGregor Burns in his descriptive research of political leaders. Afterwards the concept was reengineered by Bernard M Bass to measure and indicate the impact of transformational leadership on motivation and performance of individuals.

The most common definition is suggesting that transformational leader motivates the team using charisma, inspiration, intellectual stimulation, and individual consideration25.

**Transformational leaders** are described as being capable of motivating followers to transcend their self interest to accomplish common goal (Bass, 1985). The most common characteristic of transformational leadership is described by four elements:

- **Individualized Consideration** – the degree to which leader follow individuals needs (i.e. as a mentor or coach). The leader maintains strong support and keeps communication open and provides feedback on regular

---


basis. It is also involving delegating task to team members to grant them learning opportunity

**Intellectual stimulation** – leader provides new challenges to stimulate innovation. The team is being encouraged to question beliefs, takes risks and stimulates individual info.

**Inspirational motivation** – the leader is inspiring the team to achieve common goals and motivating followers to transcend their self interest to accomplish common goal.

**Idealized Influence** (charisma) indicates “transformational leaders have associates who view them in an idealized way, and as such, these leaders wield much power and influence over followers.”

From this short description we can see that the transformational leadership is driven by change and operate outside the boundaries. When we take into consideration work in virtual environment this seems to be especially important as the leader is the main driver to achieve success on the project and provide the team with the clear vision and motivate them to achieve common goal aligned with organization strategy. Later in this paperwork the analysis of interview will clearly indicate why nowadays this is preferred style in a very dynamic project environment around the world. Transactional leadership has greater effect on the followers due to the fact that transformational leader works as a change agent and motivates the followers to go beyond what is required. Most authors agreed that the transformational styles has stronger visibility in collocated teams and the challenge appears how to introduce it to virtual team management.

According to Conger & Kanungo the main factor here is charisma which is set of elements like being a risk taker; visioner and entrepreneur, which could be hard to present at the end of the phone. Another one which could be very hard to achieve not using face to face interaction is building relationship and gaining trust from the virtual team members. According to Kimball & Eunice virtual team tend to focus more on tasks achievement and logistic then on relationship between team members – which could be

totally understandable taking into consideration all the difficulties like communication and lack of opportunities to simply have a lunch together or chat over the coffee machine. This is leading to simple conclusion that not enough focus on interpersonal process and relationship may have negative effect on team development\(^31\). Another well-known difficulty can be isolation from other team members\(^32\). From the author experience this could be extended by boredom of working for example from home as nowadays this is becoming very popular form of employment which is allowing to save cost of rental space and other things like electricity or water. In a long term the individual can feel not only isolated from the team but bored and lonely with feeling of not being part of the team and not having much impact on the project itself.

Not only isolation can be a problem here – not spending time with other team members is limiting the possibility of self-development by watching other people at work and share experiences on the spot with them – this is especially frustrated for young individuals hungry for knowledge and experience.

**Transactional leadership** is the driven by specific exchange process where team members getting awards from completing specific goals or achieving specific performance levels\(^33\). This style concentrates more on working in the process silo which can be good in process orientated environment where achieving goals and increasing performance in a short term is the key value and providing visible incentives for the team members instead of focusing on individuals needs and building long terms relationships is priority. Similar to transformational style, this one is described by two, not four, elements:

**Contingent reward** – this leadership factor involves continuous interaction between a leader and a team member, which focus on exchange between those two. Especially leader is providing the agreed award (could be bonus; extra holidays; positive feedback to line management) and it exchange the individual is performing to meet pre-define objectives. This is of course working both ways – to boost up the performance positive rewards could be put in place but if the project is over the budget also negative reinforcement


could be use like reprimands or aggressive approach to speed up things and deliver expected results\textsuperscript{34}.

**Management by exception** – this is the style which has not been recognized as an effective as far as good leaders are concerned (Bass & Avolio). The leader is interfering only when a team member deviates from the established standards or the problem escalates to such a rank that his intervention is required. The tools using at this moment are mostly negative and for sure are not building long-lasting relationships.

Both of the styles have been widely described in the literature and have practical reflection in different projects; situations, organization. In general and when it comes to managing virtual teams, they are dependent on different factors like maturity and policy of organization; maturity of the leader itself and team members, and many more.

The level of leadership, which needs to be applied, depends on the project complexity. As far as outsourcing goes (or in most cases offshoring model is build) there is rather assumption that the workload which will be transferred across will have low to medium complexity and the core and most complex programme and projects will remain in the mother company or country. So what kind of projects we are talking about and if we really can call them like this anymore?

Most of the IT companies which are providing IT services for other companies are operating with the term RFS (request for service). The scope of RFS can vary quite significantly and the simple request which are still being consider as a project (due to the fact that project manager is being assigned to execute them) can have in scope simple things like adding a certain number of servers to the data center, do the simple migration, add storage or build the application in the new environment. The level of complexity of these projects would be rather low as most of the time there is no dedicated team and the technical resources are being provided from the shared pools which is eliminating the team management factor to minimum (it could also happen that we even do not know people which are working for us as the work distribution is being manage by the system and project manager has only task to fill in the requirements in the specific tool as an input and as an output he is getting the certain deliverable).

Additionally, these type of projects also do not require any sophisticated project management methods (like proper risk management, cost management or change management). Of course all these artifacts can be prepared but at the end of the day the whole management would be simple mind map or excel sheet with the checklist. Even the cost management is not really necessary as in big companies the certain activities are already catalogued in the reference architecture or delivery catalogue so it is already calculated that building for example virtual server is taking 2 man-days and based on this customer is being charged accordingly.

IT companies which are providing services are all the time in pursuit of automation and this is also concerning project management environment. But what does it mean to automate project management and if it really can be done? This is again something which is based on the complexity (it is always simple to automatize less complex environment). For example we can apply project dispatching which will be applicable for the low complex projects. The model would assume that on one side we have a pipeline of project managers which are divided into categories either by the level of specialization or expertise. On the other side we will have to have mechanism which is categorizing projects into specific categories based on the defined factors (like man-days, budget, scope, etc.) and then direct the project to the right project manager. Another element of optimization would be as mentioned before the define value of certain activities which can easily help us to build a project cost for the customer and simplify the cost management element to the necessary minimum from the project manager perspective.

Another very important parameters on the way to standardization of project management work would be a way how we are handle planning activities and using our best practices and knowledge databases repositories for the repeatable model solution. As IT provider, by doing projects we are providing different solution to client, however some or even most of them will repeat from client to client. The key to be efficient here is to be sure we are documenting these cases and are building structure around it. Things like the whole plans and approaches how to address specific knowledge are invaluable source of information and can prevent us from situation when either project manager or the team need to “invent the wheel everytime”. Of course these type of things need to be tailored for the specific customer requirements, but the project like data center builds or data center relocations contain always specific elements, which we need to follow or think about while putting plans in place, managing risks and issue or planning resources and procurement.
To be sure that this is in place, it should be essential to establish in the company the body which is either PMO or (even better) Centre of Excellence, which can help use standardized project management practices throughout the organization, as well as capture and share lessons learned, best practices and facilitate the knowledge sharing, so the companies can do things right at the first time and utilize the resources in the optimal fashion to impact the business.

Having all these artifacts in place is the key to be more agile and faster than the competition.

6.1. Virtual teams in IT outsourcing project teams

When we are talking about the IT project management in the outsourcing environment we cannot for sure forget about 2 things: communication and diversity – cultural differences.

As today IT services are provided from almost each continent it is highly unlikely that we would be able to work only with same nationals in the team which are physically collocated. Of course to some extent that would make things much easier but nowadays IT services for both Western Europe and USA are being provided from around the world (with focus on Asia and CEE Europe countries). Therefore the factors mentioned above are absolutely crucial to provide the project services for the customer.

Let’s start with the communication. Communication itself according to subject literature is consuming up to 90% of project manager time. Honestly I never measured it myself but for sure without proper communication, especially in global, dispersed environment, we would not be able to deliver to the customer or probably not even to form the right steps to start with.

Let’s have a brief overview what are the basis of communication.

According to Mehrabian and Ferris 55% of message sending during our communication is generated by body language, which in virtual teams is the natural limitation as we cannot see each other35. The thing which can be employed and help are video conferences but people who were using it are

jointly agreed it cannot replace face-to-face interaction and still body language is limited.

![Diagram of Mehrabian cycle]

**Figure 28. Mehrabian cycle**

Because they lack nonverbal part of the message, which is something naturally in collocated environment, virtual teams are faced with roadblocks toward effective communication\(^\text{36}\). Compare to face – to – face teams social interaction is limited, communication and some emotional expression which can be widely employed in non – virtual environment\(^\text{37}\). Also following Mayer\(^\text{38}\), emotional individuals which are skilled in managing and detecting emotions are limited in virtual environment.

Recent studies indicate that effectiveness of virtual team is tied to trust\(^\text{39}\) and the virtual teams improved in the overall performance and becoming as effective as collocated teams\(^\text{40}\) in specific areas\(^\text{41}\).


Virtual teams consist of individuals who work in different geographical locations; different time zones, interdependently using communication technology to completed a project or achieve the organization goal\(^{42}\). Nowadays, virtual teams may interact and communicate using wide range of different methods like email; phone; instant messaging; tele and video conferences\(^{43}\). Although virtual teams are bringing to organization well – known benefits like cost reduction or more flexibility (home working possibility) in most cases they are suffer from complete lack face-to-face interaction and all non – verbal message which as mentioned before are mayor part of the message between two or more participants.

According to media richness theory\(^{44}\) lack of these artifacts (compared to traditional collocated teams) in long term reduces the quality of communication amongst virtual team members.

Additionally some researches have shown that virtual teams communicate less information then face – to face teams. This fact was also supported by interviews conducted amongst leaders with indication that losing the possibility of the chat over the coffee machine or during lunch is limiting the communications to certain extend. Also relationships in virtual teams are developing slower than in virtual teams\(^{45}\). This is suffering from the same factors as describe above – lack of social interlock between team members.

All of these indicates that communication is virtual teams is more difficult and requires more effort and leadership skills to make it effective.

Having in mind the effective communication is critical in managing the team\(^{46}\) and also that according to most methodologies 90% of managing projects is effective communication, understanding how communication impacting team performance is crucial in today business world.


6.2. Communication tools – example research

As a part of a practical case study and own research presentation, the interesting research can be invoked. The research was taken on the group of fifteen project manager professionals across different countries in the world leading IT outsourcing organization.

In the research, communication tools were described and its impact on performance of the virtual teams. Respondents said communication has major impact on the performance. Good communication always increases performance. They mentioned the following communication tools: instant messenger, e-mail, phone, conferences calls. The most important were: e-mail (mentioned by 93% of respondents) and instant messenger (mentioned by 87% of respondents). As research show, instant messenger simulate real time conversation. They do not cause misunderstandings caused by pronunciation or accent.

E-mail is very important and is seen as a tool to confirm all agreements from calls and teleconferences. It is important that the issues of language difficulties and national behavior are visible. It is a proof that we do not fully trust each other.

![Communication tools used by the virtual teams in research study](image)

**Figure 29. Communication tools used by the virtual teams in research study**

Source: own work.
These communication tools in virtual teams can be classified as follows: instant messengers – for quick responding and real life conversations and e-mails as official way of communication and footprint of our agreements/actions.

Communication in the virtual team must be planned and agreed in advance. This plan should contain information: who and when needs the information.

Communication next to leadership was chosen as the most important factor which is impacting performance of virtual teams. The only fact why it was not in the first place was because majority of participants were saying that you need to have good leader in place and employee proper leadership style so the communication is proper as well. The other crucial thing about communication in virtual environment is the fact that participants of communication are limited to only words and tone of the voice.

The importance of communication in virtual teams and its impact on team performance has also been shown during the interviews.

Nowadays technology allows us to reduce the difficulties with communication in remote environment. The most popular means of communication so far (email and phone) recently have been supported by other tools and means of communication. The most popular at the moment are instant messaging system and all the telephony which is built in, video conferences and possibility to share the screen during a meeting. This is giving us opportunity to lead active communication with team members across the world (assuming with have appropriate infrastructure and transfer speed). But how different tools are fitting in overall communication system and what is the impact on the performance?

**Email** – this is the most standard and common way of communication. Probably all of the people in business world using it, and not only in virtual teams, as this is kind of the confirmation that something was agreed.

Even taken into consideration the fact that this is the tool which is allowing for less interaction it is still very important due to the one single reason. It is allowing to document what was said and leaving a trace of it. This is extremely important for example when taking confirmation or agreement regarding some actions. Additionally when conducting virtual meeting, taking minutes afterwards and send it by email is giving us opportunity to be sure that at least everyone should be on the same page. This has positive impact on performance and in terms of overcome language barriers as some
people maybe not able to understand everything on the phone due to different reasons like command of English, using different accent or noises on the line. Putting straight afterwards everything in writing giving us a comfort of common message which could be understand by everyone (for most people it is a lot easier to understand something which is written that something what was said on the call). This also could allow us to reduce the waste due to misunderstanding during the call. If someone pick up some wording incorrectly, or due to the local jargon understood something incorrectly, putting this in writing can prevent us for making waste and double effort.

Of course using emails has it downfall as well when it comes to communication and performance. One of the most annoying would be tendency to create email chains which are including numerous people. In most cases when people are seeing more then couple of emails that they need to read as a history they are giving up or loosing a lot of time which could be use elsewhere. The other thing when it comes to email communication is the fact that people are assuming that sending an email means that other person understood it and will comply. Taking this as a fact many people are not following it and assuming that something will be done. This of course leading to misunderstanding and waste of time as on many occasion noone is doing anything about something and the sender of the message thinks everything was done or understood according to his request. The other thing when it comes to email as a communication tool is the fact that it can be directed to more then one person without indicating who is to execute the request. This again can lead to waste and lags during task performance.

**Telephone/teleconference** – the second is the standard tool using for communication in virtual environment. Phone is giving us opportunity to contact people immediately instead of sending them email and waiting for a reply. This of course can greatly impact the performance by reducing waiting time. Also using teleconferences will allow gathering a group of people in the same place and avoiding email chains. This can be use to conduct a workshop; some planning session or others. However for such events good preparation are required to moderate the discussion (especially when we have numerous people on the call) and be sure everyone is sticking to the planned agenda. The only downfall of this tool was lack of the trace but when using together with above mentioned email it is building very effective communication combo.

**Instant messaging** – this according to participants is the best way to communicate in virtual environment with the highest impact on performance.
Due to its multiple function it allows many things which positively impacting the performance. For example we are allowed to chat with many people on different subjects which allowing us to be flexible and it is introduction to multitasking. Also this is a tool which allowing us to get an answer faster then and email and allowing for direct interlock between sender and receiver. There is no waste in terms of waiting for a respond and we have far more certainty the receiver read a message which in case of using email can be buried under other hundreds of them. The other very important thing, especially in virtual team environment, is group chat which is kind of the substitute of people seating in one room. Multichat allows them to focus on tasks and have a platform where they can ask questions and sort out any doubts. It is allowing multiple individuals to join the conversation; have a trace of it and also sort out the barrier languages. Anyone who used it during projects or day to day tasks knows how greatly it can improve performance of the virtual team and keep team member on the same page for days (as it could be active for days and we can always come back to it). Some instant messengers have other advantage like screen sharing or build in telephony. These adds on (especially screen sharing with live meeting options) are extremely important, and also have huge correlation with knowledge sharing, as it is allowing us to take active part in remote shadowing session.

**Videoconferences** – surprisingly this tool was not found as a great way to work. Interviewed participants did not find it as a great way to replace face to face interaction and the effort required to set it up in most cases is the barrier to use it. To some extend it allows making communication fuller, as body language can be included, but seeing people on the screen was not regarded as a best solution.

As far as communication in virtual teams are concern there is also second aspect of its impact on virtual team performance. The way how the leader is communicating message to the team is of great importance. Communication in virtual environment needs to be better planned as it could happen that once communication will be announce via email or during teleconference it would be hard to correct it or reverse it due to the lack of direct interlock between people. Also as mentioned at the beginning, due to the lack of full communication scope (body language and tone of the voice – as over the phone the tone of the voice can be disturbed or misunderstood) the leader needs to put a lot of more effort to communicate properly. Furthermore the barrier language needs to be taken into consideration and the fact that we need to double check that our communication is received and interpreted
in right way. Interviewed people in most cases agreed that again it is up to leader to set a proper communication plan at the team level and execute it to maintain the communication across the teams. It is very important that everything is communicated and people are on the same page as there is a risk that some message could not reach the right people which will negatively impact performance (because something was not done; or done not as it should be). Therefore it is so important to plan the communication in virtual teams and monitor how it is impacting the team and where the gaps are so it can be continuously improved.

### 6.3. Summary

Due to the fact that in the last couple of years offshoring initiatives are becoming the major business driver for cost savings and filling resources gaps in home countries for biggest corporation around the world, virtual team has become the natural entity in today business world. For example, Poland itself has become one of the biggest provided of offshoring services standing alongside with India and China in one line. The recent statistics are showing that Krakow has more people working in offshoring business that Bangalore in India.

All in all this is showing what is the great importance to develop different methods and examine the virtual teams with all its limitations to allow at least in some extend come closer to the performance of physical teams.

Leadership, cultural diversities, communication, knowledge sharing and motivation are the factors which are being consider as key in building effective teams both collocated and virtual. The reason for this is self-explanatory – these are the factors which are driving everything else. Especially following literature and expert opinions leadership is the key one amongst those five as being an effective leader is the fundament to proper communication, managing cultural diversities to our advantage and driving knowledge sharing and motivation to increase performance. Flexible management of above is allowing us to work in controlled environment and boost performance to our advantage or prevent the situation when it can be decrease due to the negative impact of above factors.
7. Leadership as a driver for innovative projects – key challenges and winning solutions

Wojciech Muras

Project management demonstrates the ability of the organization to take on new innovative challenges. The classical approach including resource planning, formal documentation and official meetings is not enough in a high competition business environment and shortened competitive advantage. Projects are implemented by the people and therefore project management does not exist in isolation from those in the processes involved.

Completing the innovative projects bring to light those processes in organizations that do not work efficiently at the operational level and require radical changes mostly in operational infrastructure. Project management will be as effective as the people implementing it. International Institute Research indicate the three factor for building the proven operational infrastructure: leadership, value model and tacit knowledge disclosure. The innovative projects involve more knowledge capital than financial capital. Changes in the way we work, growing expectations of stakeholders and customer’s individual needs drive the transformation.

This article presents key aspects of providing the enterprise infrastructure supporting effective project management in a rapidly changing business environment. It’s shown that the fundamental resource is strong leadership promoting the new value model including collective intelligence as a foundation for the concept of Enterprise 2.0. It’s shown there is a growing shortages of resources dedicated to the projects that in a consequence stimulate the change in the way the new initiatives are managed. It’s proved that the transformation from “developed within organization” into “developed in conjunction with the customer” is undergoing.
7.1. Enterprise Infrastructure  
- transformation from hierarchy structure to the process owner

Reengineering as a method for transformation of enterprise infrastructure is proved to be the best solution in companies where business processes took over the paradigm of flexibility. In practice this means that the transfer of decision making to lower levels of organizational structures and those working closer to the process. The expected result is to improve the efficiency of operational activities and a clearer picture of the impact of employee’s commitment to the results achieved by the company. In turn, customers receive a more tailored service to meet its requirements and shareholders achieve better returns on investment.

A key element of transformation is the customer oriented processes around which optimal workflows, communication principles and characteristics of the product and service are to be build. A visible symptom of the change is the process owner with genuine impact on the project budget, human resources and direct contacts with the recipient of the services. It’s said that successful transformation involves three important skills from the process owners: interaction, interaction, interaction.”47

For large enterprises it is hardly possible to wind up the hierarchical structures but the key value is the ability to negotiate the terms of cooperation between process owners and managers of business units. The role of business unit managers combines developing capacity building and searching for operational efficiency. Service delivery is the main area of responsibilities of process owners staying in touch with the customer’s individual expectations.

Such approach improves the possibility of performance measurement. In a global economy and innovative projects the success or failure criteria should be defined and measured not only within the organization but also outside it.

7.2. The new paradigm of projects - consolidation, collective work, the strength of the recipient

Leader has to operate in the deficit of human resources, time and money. This forces the leaders to decide on granting priority in accordance with strategic objectives. Searching for decision-making attributes which projects should be implemented is to act in three areas:

a) the impact of new product based on effective selection of activities and consolidation of operations,

b) the strength of external resources following the courage to share the risks and potential future benefits,

c) the strength of recipients as active reviewers of functional and technical requirements of new products.

The impact analysis shows the workflow from design to product as described in the Figure 30. It’s seen that many small projects in the enterprise make process management complicated where the key challenges is to achieve the impact of final effects understood as sales performance or an operational performance. As shown by numerous observations too many projects lead to degradation effect and have direct influence for omission further initiatives because of the lack of practical application in previous ones and lack of visible benefits. From the enterprise perspective the next consequence the motivation and courage to take on more risky challenges is strongly reduced.

A more effective approach48 is a method of transformation from many small projects into several but larger ones aligned and consistent with the strategic objectives allowing for product development with higher impact strength. As shown in Figure 30, the impact in the final phase of implementation is rising for a fewer number of projects. That indicates that the leaders must continuously make choices and eliminate the projects with low impact on the operational and strategic performance. Even if these actions are abandoned for projects in progress.

48 Jankowski W.: From the Enterprise 1.0 to Enterprise 2.0: Challenges and Dilemmas” ICAN Institute publication.
In addition to promoting projects with high impact, leaders should concentrate on sources of competitive advantage through the implementation of innovative projects. One of the perspective is the “Model of Open Innovation”\(^{49}\) which defines the selection criteria based on three key phases: concept, development and commercialization.

Innovative projects are associated with high level of risk acceptance and support coming from the entire organization in the process of experimentation. Enterprise infrastructure with decision-making and continuous improvement culture\(^{50}\) is absolute priority.

The strength of the external teams is shown in the example of Innocentive business model\(^{51}\). NASA with its high funds\(^{52}\) decided to engage Innocentive in finding the solution. The challenge was to predict solar flares which is important issue in terms of communication strategies that affect both defense policy, space research, but also the dangers for every inhabitant of the

---

\(^{49}\) Dutkowski R., The publication of ICAN Institute.

\(^{50}\) Detert J., Schroeder R., Mauriel J.: “A Framework for Linking Culture and Improvement Initiatives in Organizations”.


\(^{52}\) McAfee A.: Enterprise 2.0 a modern tool to improve business operations, ICAN Institute.
earth. The results that NASA received in the model of work limited to its own scientific resources allow to predict flares of the sun up to 4 hours earlier with the probability of occurrence up to 15%. The results did not provide a basis for practical applications in crisis management. Therefore, NASA decided to engage the external teams, described the problem and released to Innocentive. The most helpful turned out to be a retired engineer whose solution was later recognized by NASA and is now the official solution. The results predict the sun flares up to 8 hours and the probability of occurrence up to 75%. Better results stem from a different approach that is mostly available in case of external teams. The limited capacity of the enterprise and easily available experience worldwide indicates that the appropriate team to find the most effective solution is not working inside but outside the company.

The strength of the recipient is best described by comparison of cooperation model: classical versus collaboration. In the classic model, implemented in accordance with the message “If we make it here, they (the clients) come to us”, projects and products are created within the framework of the organization which significantly hinders the ability to benefit from great market experience and specific customer’s requirements. In the final phase of implementation the product requires high marketing expenditure and validation. In addition, the lack of reference list and the possibility of continuous improvement delays the effective implementation of corrective actions. In the collaboration model implemented in accordance with the message “If we create it together with them, they (customers) already will be there” implies collective intelligence. This approach strongly minimizes project risks and shortens return on investment (ROI).

**Natural barriers - the leader determination in change management**

Transformation of enterprises covers the change in attitude of employees from natural protection of the status quo into finding the benefits of the new model.

The task of the leader is to reduce the resistance of workers against the change. Violation of the comfort zone reduce the motivation and courage. The four phases of change\(^5^3\) are as follows:

- denial of change,
- resistance to change,

---

\(^5^3\) Rabiej P.: Change for tired change, ThinkTank magazine, No. 24 Spring 2015.
• trying new,
• acceptance.

Those phases occur according to the individual scale of intensity. Employees do not like change but appreciate the challenge. Effective change management is characterized by inner motivation (employee), patience (leader) and leadership with a strong impact.

The study of Rabiej\textsuperscript{54} shows that the leaders have a major influence on performance of change following the four key areas: skillful evaluation of the potential for change, defining the reason to change, speak to the emotions as a source of inner motivation and simple communication.

**Changing the value model - the transition from financial capital into knowledge capital**

Project management methodology as described in previous part of this book (PMI and PRINCE2) mainly indicates the resources in projects and outline the arrangements for their cooperation. It combines the aspects of project financing, workflows associated with human resources and reporting mechanisms. Even proper implementation of the principles set out in methodologies does not guarantee the operational effectiveness. Therefore, businesses are looking for a new approach with a clearly growing role of leaders and employees engaged in. The observation shows how great knowledge capital is still not involved in projects that might contribute to the success of the initiative.

In innovative projects that are still heavily dependent on financial capital is noted that there is growing participation of knowledge capital represented by organizational capital including experience and accessible knowledge database and human capital. This is also noted that in the recruitment process promoting the most experienced and open minded employees is becoming major challenge. As the involvement of local governments to the development strategy of the countries or regions arises “the delves of competence” similar to the model of Silicon Valley as areas of knowledge map capital appears.

Changing the value model also implies the competition strategies. In the 80s the competitive advantage relies on financial capital and abilities to

\textsuperscript{54} Rabiej P.: Change for tired change, ThinkTank magazine, No. 24 Spring 2015.
defend the market. In the era of new competitive advantage, know-how including organizational and human resources experience and intellectual property, abilities to create teamwork and continuous remodeling business model are prevailing.

Implementation of projects with the key objective of building a strong impact of new products reduces the risk of losing market positions as a result of the mechanism “shortened period of competitive advantage”. The period of competitive advantage was reduced from years (in the 80s) to months (current status) which fueled the impact of new model - collaboration with customers.

7.3. Sources of innovation - collective intelligence

The strength of ambition engineers, shareholders or visionaries often leads to misperception of innovation as the creation of a new product or service that has not yet been recognized on the market. As shown by numerous examples, successful innovative implementations are firmly rooted in another practical implementation of well recognized solutions. This makes the potential of the innovative implementation is hardly limited. Efficient leadership enables innovation to run through the processes of building and supporting the concept of “Enterprise 2.0”. The concept of Enterprise 2.0 was introduced by Andrew McAfee in the article “Enterprise 2.0: The Dawn of Emergent Collaboration” as a term denoting the use of Web 2.0 technology by enterprises to achieve their business objectives and cooperation between enterprises, customers and partners.

Effective implementation of projects is the team motivation. Every opportunities to promote and share experiences in the project within the international community build confidence in employees and creates the possibilities to promote own personal brand.

Operational implementation of that approach is made possible through the use of intuitive-to-use platform for sharing ideas, experiences and contacts. Managed platform supported by a genuine commitment of TOP

---

55 Jankowski W.: From the Enterprise 1.0 to Enterprise 2.0: Challenges and Dilemmas” ICAN Institute publication.
Management contributes to cost-effective model of project management, improve the quality of services through gathering user experiences to address the needs of continuous improvement.

As shown in the studies performed within the international market new technology in management processes takes time and demands a lot of endurance offered by Top Management and employees. It’s shown that even in the cases when implementation of new technology did not produce the desired results it gave the organization’s intellectual capital. The most beneficial trials are those involving the customer’s engagement unlocking the potential to competitive advantage.

The key results achieved by the concept of Enterprise 2.0 is the collective intelligence understood as the “wisdom of the crowd”. It’s observed how great and tacit knowledge lies in each of employee and it becomes available only when it is requested in encouraging way promoting the personal brand building.

To examine the possibilities of new technology the mere publishing simple inquire into social media platforms is a good igniter. As presented by McAfee less than 2 minutes is required to publish an inquire on Twitter platform and distribute it to a broad audience. As a result both hints as well as ready-made solution were received. It is worth analyzing the sources of those answers that come both from strong ties, weak links and potential links. Moreover a conducted conversation could be found useful for other users of open community in further development. It’s said that assuming in advance who knows the answer is bad strategy. It’s better to unleash the potential for search the solution in the model of collective intelligence.

The McKinsey Global Institute study proves that companies using the collective intelligence are gaining higher market share and improved profitability. As shown on Table 7, improvement is more than 20% that strongly contributes to enterprise performance and abilities to take on innovative projects.

---

58 McAfee A.: Enterprise 2.0 a modern tool to improve business operations, ICAN Institute.
59 Ibidem.
60 Ibidem.
61 Ibidem.
Table 7. How companies are benefiting from Web 2.0

Source: McKinsey Global Survey Results.

<table>
<thead>
<tr>
<th></th>
<th>% of respondents</th>
<th>Median improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal Uses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to Knowledge</td>
<td>68 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Access to Internal Experts</td>
<td>68 %</td>
<td>35 %</td>
</tr>
<tr>
<td>Employee Satisfaction</td>
<td>68 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Increasing Innovation</td>
<td>68 %</td>
<td>20 %</td>
</tr>
<tr>
<td><strong>External Uses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing Customer Satisfaction</td>
<td>43 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Increasing Innovation</td>
<td>22 %</td>
<td>20 %</td>
</tr>
</tbody>
</table>

Project management relies on experience gathered in databases including documentations, plans and other supporting materials. It’s observed that most practical knowledge is tacit (informal, silent). It comes from the simple fact that people know more than they can tell. The task of the leader is conducting the transformation of hidden into explicit knowledge. It requires a dialogue between members of the community through sharing their experiences which might constitute the primary source of tacit knowledge. Inviting owners of implied knowledge into open discussion supports their personal brand that for many is inner motivation and strengthen their recruitment position. Leader should pay attention to encourage original experience into open discussion. As observed the pivotal motivator of project team members for such openness can be confidence in the leadership and a platform for promoting personal brand.

As an example, can be used the social network organized by SAP addressed for users and developers of the information system which has facilitated collaboration within the company and among the professional community covering partners and customers. Every user has the opportunity to build the authority within the international environment.

It is quite an open cluster managed neither by hierarchy not age. Fundamental rule is sharing experiences and opinions without any financial salary. This formula is an alternative to well-known outsourcing where by

communities operating on the principle of open-source software it is possible to obtain the required assistance.

The concept also proved itself in companies producing boilers which has encouraged its servicemen to participate in a social project. Sharing the social platform technicians were invited to put a questions including an image of poor installation describing the problem. Others technicians were encouraged to comment on that like: “do it, turn so”. This approach significantly increased the efficiency of maintenance services and as a result had a positive effect on customer satisfaction.

The search for sources of innovation, as shown in Figure 31, surrounded by internal and external components improves opportunities for small businesses to compete with Big Enterprise securing its high operational flexibility and abilities to build synergies effect well known to the international corporation.

![Figure 31. Sources of innovation](image)

**Figure 31. Sources of innovation**
Source: Mark Połczyński, the publication of ICAN Institute.

The prerequisite for unleashing the tacit knowledge is openness and supporting such behavior by Top Management. Corporate standards might be a trap if concept of collective intelligence is published in the form of 40 paged instructions. It’s observed it doesn’t work. Implementation of the new framework for cooperation, sharing informal knowledge supported by technology

---

63 Dutkowski R., The publication of ICAN Institute.
requires patience and consequence of leaders. It’s worth mentioning that even if some of the implementation did not produce the expected results gave the organization the necessary capital associated with experimentation. Companies that are experimenting to engage their employees in sharing both tacit and explicit knowledge might notice the new possibilities in creating products for gaining competitive advantage.

### 7.4. Summary

The innovative projects and the role of leadership presented in this chapter based on research and analysis conducted by worldwide institutes and author’s own experience proves the complexity of the design process.

It’s shown that conducting the innovative projects demand both adoption of well recognized Project Management methodologies and strong leadership in introducing the enterprise transition. The impact of leadership, collective intelligence or ability to make decisions consistent with the strategic objectives of the company defines the major management performance.

It is shown that the transformation model must be preceded by enterprise infrastructure supporting the process owner, strong leadership ready to take a risky decisions combining both rejection and consolidation projects and openness to new model of cooperation with external partners. It’s proved that new technology promoting social networks might improve the operational performance and unleash the tacit knowledge.

In transformation process it’s necessary to take into account the values represented by enterprise and leaders. Authentic leaders.
8. Open Source and Innovative Solutions for Project Management

Elitsa Petrova, Maciej Rostański

There are plenty of exciting new technology in the world, and in its transformation— in products and services there are many factors that must be taken into account by the organization. Business companies must be able to adapt to the new environment and to develop. Moreover, they must work with the knowledge that their competitors will inevitably offer to the market a product that will try to change the competition in its favor. Today the idea of innovation has become a part of our culture. In almost every industry, dominant companies demonstrate their ability to create and disseminate innovation. The industrial revolution of the 21st century is fueled by technological innovation, which are an important element in the development of human societies.

Project management is focused on planning, organizing, securing and managing resources to bring about the successful completion of specific objectives of a project initiative. It can be formulated as a fulfillment of a set of activities, namely:

- Setting goals
- Establishing the schedule of the project
- Evaluation of resources and ensuring that they are used correctly
- Preparation of project budget
- Organizing relevant documents and records
- Analyzing the current conditions of the project and forecasting of future trends
- Identifying potential project risks and developing a plan for risk management and risk prevention
- Delegating specific tasks to individuals or groups and analyze the progress
- Quality control of products of the project
• Facilitating communication between project members and between them and external stakeholders

• Monitoring for maximum efficiency.

In broad terms, the project is an implementation of all activities of the process starting from the creating an idea until its implementation within the planned budget, duration and quality, which are associated with specific technical function and identifiable goals. The projects create new outputs/outcomes that enable an implementation of new benefits for the individual, organization and society as a whole. They are temporary arrangements, susceptible to the risk created for a certain time, with a participation of many stakeholders of the organization and beyond.

In summary, the key elements of the project are:

• Purpose and scope of the project – they present information related to the basic parameters of the project - goals, objectives, duration, resource availability, alternatives for implementation and financing.

• Timeline - presents all the necessary information to ensure that the planned deadlines are real and actually feasible.

• Financial and economic analysis of the project and preparation of project budget.

• Risk analysis - regulates all processes that need to be planned and implemented to minimize the likelihood of a change in the planned parameters of the project.

• Human resources management and communications - describes the planned activities related to the management of human resources in the project and regulates the shape, location, time and participants in obtaining information.

Open Source Software

The term “project management software” refers to a set of resources that facilitate the organization of complex projects. It can be used to create systematic schedule of the project from its beginning to its end. The project management software usually includes a variety of functions, the most common of which are:

• Creation and track timetable of the project schedule and resources

• Management of portfolio of projects
• Resource management
• Document management
• Maintaining database of best practices, accounting issues and problems in the project.

Some programs for project management are available online. Using the Internet, the user can start them through a browser. Other programs are available for a fee. They are purchased by the organization and can be run from its internal network or directly from the computer desktop. The software can be used on multiple computers from multiple users, where it is shared in internal network. An easy access is one of the advantages of the online software that can be used. However, it should be borne in mind that the available online programs are slower than those that are installed on the computer, and handling, processing and attaching large files takes more time.

The project management software can also be divided into software for “a single user” and software used by multiple users together. The collaborative software has the advantage in it to be imported changes by more users, and the results are accessible to all members of the group. In the development and implementation of larger, more complex projects, the benefits of collaborative software are obvious. In these cases the projects can be more effectively subdivided into smaller tasks.

There are two options for the provision of software - by a “patent” and as an “open source”. In presence of property license, issuer retains certain rights of software, as is documented in license agreement. Open Source Software for Project Management is dedicated to those applications, whose source code is publicly available for viewing and editing.

The Rules for Open Source Products based on Open Source Initiative (Opensource.org 2013):
• Free distribution.
• The program must include source code, and must allow its spread.
• The license must allow modifications of the code and its additions.
• The license must not discriminate people or groups of people.
• The license must not restrict the use of the program in different areas.
• Rights assigned to each program must be mandatory for anyone who uses it without the need for additional licenses.
• The license must be for a specific product.
8.1. Open Source Software for managing projects

Open source software for Project Management is a developing and published software, for improving cooperation with other developers of software projects and sharing the design code. The source code is available to all users. Often, users can download this software on multiple platforms as many times as needed. Most applications are available anytime online. The cost of project management software varies widely from $50 to $20,000 and more. Unlike expensive programs for project management, the open source software usually offers free limited version and a different price plans. Many users prefer to use this type of software solutions because they are free and have access to almost every tool that offers professional paid programs.

Open Workbench

*Open Workbench* (CA, 2013) is a free program and users can download the software on multiple platforms. Currently, Windows support the software. The source code is available to all users. The program allows monitoring project progress using Gantt and PERT charts. Users who use Microsoft Project can import schedules and diagrams in Open Workbench. Open Workbench is a free software and is free to spread within an enterprise. Open Workbench is not only free but also open source software.

Codendi

While other software solutions offer common modules and tools, *Codendi* (Groupe Viseo 2013) is designed with the intention to facilitate the organization, communication and knowledge transfer between team members working on projects for software development. Perhaps, the most striking feature of *Codendi* is the fact that it is open source software. This means that anyone who has enough technical knowledge can expand the usability of the program. The software can be easily installed on different computer operating systems. It works with Windows, Linux or Mac OS X. Currently, it does not support remote login via web browser or mobile phone. Trial version is available on the official website of *Codendi*.

*Codendi* differs from other programs with its built-up maintenance for tracking errors. Team members do not only come together on the project, but also can report bugs, and these data are immediately shared with other
team members and each bug is displayed in readable graphical format, so that information to be visible to all.

The program provides an opportunity to generate a story about the creation and tracking information and the necessary documents can be displayed on screen. The Wikipedia of project software is another way that facilitates the exchange of information between team members. There is an online encyclopedia where anyone can create and edit articles. In addition to the free program are distributed paid upgrades, for users up to 25 people. The plans of ProEdition cost € 1,750 per year and the plans of Proservices cost € 6,100 per year.

**Collabtive**

*Collabtive* (Open Dynamics 2013) is open source software for managing projects for group work. It works with all major browsers such as Internet Explorer (7/8), Chrome, Firefox, Safari and Opera and supplies simple and intuitive user interface and cooperation between all individual projects of the company. Collabtive is online accessible at any time. It is available free in limited version and in various price plans for unlimited users and projects.

The distinguishing features of the program are:

- Ability to manage unlimited projects
- Possibility for unlimited number of members with individual user profiles
- Possibility of transmission of instant messages
- Possibility to manage files
- Preparing of activity diaries and reports on time
- Data export
- Feeds for tasks and messages.

**Launchpad**

*Launchpad* (Canonical Ltd. 2004-2015) offers tips and published software, which improve cooperation with other developers of software projects and sharing of projecting code. Using Launchpad eliminates the need for external hosting mail. Launchpad mailing lists are team-oriented and easy to use. All members of the team are able to subscribe to them.

The distinguishing features of the program are:

- Tracking errors and bugs reports
- Python library
- Ubuntu hosting package
• Automatic software updates.

Launchpad is available at any time after registration and can be used with online access to the site of the platform.

**OpenProj**

*OpenProj* (OpenProject 2013) is an open application for project management, which serves more than one million users worldwide. Microsoft Project is the only other application for managing projects with more users. Many users prefer OpenProj, because this software is free, and the clients have access almost every tool that Microsoft Project provides.

The main functions of OpenProject include:

• analysis and diagnosis of terms and stages of the project
• monitoring of all project activities, including tasks, change requests, deadlines, priorities, responsibilities, commentary and history
• easy management of documents through integrated data warehouse, including automatic document control and the ability to display the history of changes to documents
• creation, maintaining and sharing information on Wikipedia project
• reporting on the cost of resources
• exchange of information between team news and forums.

OpenProj is an open source software and is also free of charge. Users can download the application as many times as necessary. Existing files can be easily imported from Microsoft Project to OpenProj. OpenProj runs on multiple platforms, including Windows, Mac, Linux and Unix. Any company can benefit from using OpenProj. Nokia, UBS, Lockheed Martin, Thomson Reuters, Johnson & Johnson, Pfizer and others have used the product.

**Planner**

*Planner* (The GNOME Project 2005-2013) is an open source application for managing projects developed for the operating system Linux. Planner does not use an HTML interface but the GNOME desktop environment for Linux, which must be installed locally on each computer, such as a computer must be seen to maintain operating system Linux. The program is constantly updated by a core group of volunteers working on the development of the program in debugging and adding new features.
The program is easy to use and has a simplified interface. Its unique characteristics are using resource module that allows the project manager quick reference to the individual performance of each team member and screen tasks, which allows the project manager to set specific objectives for each project, and a list of people who will work.

### 8.2. Innovative software solutions for project management

Besides assisting in the organization and execution of ordinary project activities, a number of software solutions are targeted at specific problem areas.

**DeskAway**

Online project management is an important part of daily business operations, therefore *DeskAway* is entirely web-based program, so to be used is not necessary download or installation. It is possible to be used by IE6, IE7, Mozilla, Firefox2, Safari2 in Windows, Mac or Linux. It provides an easy to use web interface that is completely intuitive.

The web application allows (Synage Software Pvt. Ltd. and DeskAway, 2005-2015):

- Monitoring of all project activities
- Delegating tasks to the staff
- Monitoring the status of the project at any time
- Adding comments to each project
- Tracking the level of priority
- Sending messages to members of the project
- Exporting reports in a spreadsheet
- Importing data into a zip file.

DeskAway allows users to import data from other project management tool. Full archive of all project data can be viewed at any time. In DeskAway it is possible to enter with iPhone Blackberry and Android. It offers 256-bit SSL encryption with paid monthly subscription plans, which implies a high degree of information security. It offers a free account for one project, 3 users and limit information 25 MB, and various price plans with unlimited number
of users from $25 monthly to a price of $99 monthly for unlimited number of projects and limit of used information - 25 GB.

**EasyProjects**

Easy Projects (Logic Software, Inc., 2004-2015) is a web-based system available 365 days a year, 24/7 for project management. Main directions of the system are:
- Management of portfolios of projects
- Management tasks
- Time management
- Management of resources
- Management of orders
- Team collaboration
- Analysis, data import and data export
- Invoicing
- Integration and others.

Easy Projects offers a free trial period of 15 days. It also offers a free account for one user, an unlimited number of projects and limit information of 100 MB. It offers different pricing plans depending on the number of users and limit of used information. Its price ranges from $24.99 monthly to $874.65 monthly.

**Intellect Platform Interneer**

*Intellect Platform Interneer* (Interneer Inc., 2013) is a software solution for business process management (BPM). Interneer is used due to its extensive features that include overall management of the project life cycle. The platform focuses on three main areas - human resources management, project management and construction management.

The platform allows:
- Automation of workflows
- Easy integration with existing databases
- Using at any time by most web - browsers
- Arranging the processes in real time
- Tracking the activities.
Microsoft Project Professional

_Microsoft Project Professional_ (Microsoft, 2013) is a program that makes it possible to manage multiple projects through a single interface. It allows time management, effective and intuitive resource allocation, creating plans, management of people. It is easy to identify the various types of data, organizing and analyzing large amounts of information. Microsoft Project Professional 2013 can be purchased for $1,159.99 or try for a free 60-day period.

Besides the usual features typical for most types of project management software, it also enables:
- Creating own project website
- Creating presentations for the project
- Coping and pasting information from Microsoft Project into the familiar Microsoft Office applications such as Microsoft Word and Microsoft PowerPoint
- Tools such as Team Planner for forecasting potential problems by analysis on the script “what-if”
- Detection of potential problems
- Sharing ideas and communication in real time with team members worldwide.

ProjectManager

_ProjectManager_ (ProjectManager.com, 2013) is a web-based platform allowing to be used at any time and from any location. Its features include online collaboration, project planning, tracking, scheduling, resource allocation, integration with Google and MS Office.

ProjectManager enables:
- Customization of dashboard project
- Creating and sharing plans
- Creating and planning of tasks online
- Changing the distribution of tasks
- Managing team worked hours
- Generating reports on the progress of the project and export them to PDF, Word or Excel
- Creating of own Dashboard with specific work schedule
- Costs monitoring
• Tracking people, equipment and materials
• Sharing and storing documents online.

The control panel provides a graphical overview of the status of projects online and automatically updates information entered by users. There is an opportunity for discussion, adding documents, spreadsheets, images and update them in real time.

Full integration with Microsoft Office allows users to import and export data to and from Microsoft Excel, Microsoft Project and Microsoft Word, and online sharing. There is a full integration with Google Apps, including Gmail, Docs, Calendar and Spreadsheets. Free Mobile Apps are available for iphone, IPAD and Android.

The work platform is protected with 128-bit encryption. There are different price plans depending on the number of users, with prices from $ 15 per user for over than 10 users to $ 25 per user for 5 users. It is available in a free trial period of 30 days.

VisionProject

*VisionProject* (Visionproject.se, 2013) is easy to use system for project management, which focuses on creating a specific user interface. Its main panel can be customized with items such as tasks, project issues, activities, schedules and more.

The system supports:
• time management with an assessment of time / cost
• main page of the project contains the status of the project and gives information on costs and project’s progress by presenting them with different types of charts
• the ability to create projects using design templates.

VisionProject is available to the user in the form of installed application on the client’s server or as a hosted version. VisionProject offers several levels of pricing depending on the service package. Customers can create a free trial account to try out the software before to buy it. The basic module, ie core software platform, is provided for a price of € 19 monthly. Every user can add different modules to it. For adding a module for project management to the price are added € 4, for an e-mail module - € 4, for a module for corporate branding - € 5, for a module for relationship management with clients - € 4.
TeamWork Project Manager

*TeamWork Project Manager* (Digital Crew Ltd., 2013) is an application for project management with a focus on teamwork. The program is accessible from anywhere through a web-based interface. Dashboard software provides a quick overview of all projects. The main stages are displayed on the calendar with upcoming deadlines. There is an option to upload multiple files and the opportunity to choose which team members have access to the files of the project.

The program offers several options of price plans that vary from $12 to $149 per a month. There is also a free trial period of 30 days.

The program supports:

- automatic updates
- calendar
- event tracking
- management of projects portfolio
- tracking project status
- risk management
- management tasks
- privacy settings
- iPhone App, Mobile version
- internal Email
- RSS Feed
- document management
- exchange of documents and files
- cost management
- invoicing
- Google Docs integration.

TeamWork Project Manager provides access with browsers Internet Explorer, Firefox, Chrome, Safari, Opera. The mobile versions for iOS (iPad, iPhone, etc.), Android and Blackberry are available.
8.3. Conclusion

Project management is a constantly developing management area. Expansion and improvement of methods, resources, approaches and concepts of project management is carried out through to the accumulated knowledge and experience in many different areas - management, engineering, construction, information technology, and others. Because of the rapid development of modern information society, the business software is a compulsory condition for the effective management of any organization. Managing projects becomes automate and optimized by the specialized software systems.

Besides the usual problem, areas that the software project management decided innovative software solutions include additional features such as:

- Tracking the level of priority documents in project activities
- Creating own Dashboard with specific work schedule
- Easy integration with existing databases
- Management of portfolios of projects
- Creating own project website
- Creating projects using design templates
- iPhone App, Mobile version
- RSS Feed
- Google Docs integration and others.
List of references
1. “How companies are benefiting from Web 2.0.” McKinsey Global Survey Results.


41. Jankowski W.: “From the Enterprise 1.0 to Enterprise 2.0: Challenges and Dilemmas” publication ICAN Institute.


46. Karayaz, Gamze (2006). A dyadic Composition to Foster Virtual Team Effectiveness: An Experimental Study Unpublish Dissertation, Old Dominion University, Norfolk, VA.


55. McAfee A. “How companies are benefiting from Web 2.0: McKinsey Global Survey Results” published in the presentation of Enterprise 2.0.

56. McAfee A. Enterprise 2.0 a modern tool to improve business operations, ICAN Institute.


70. PMBOK Guide (2013). - best known for the PMI standards containing a set of guidelines and best practices for project management.


79. The company has 2.0, debate Drafting issued by the HBR Poland, October 2011.


List of illustrations

Figure 1. IT Management and Project Management ecosystem.................. 14

Figure 2. Project management location in the organization management .... 16

Figure 3. McKinsey 7-s diagram (based on: Robert H. Waterman, Jr., Thomas J. Peters, and Julien R. Phillips „Structure Is Not Organization”).... 17

Figure 4. Project Manager and team in the realization of project tasks...... 18

Figure 5. Pyramid of Strategic Management of IT Organization (based on Microsoft Operations Framework 4.0 Guidance)................................. 19

Figure 6. Strategic Alignment Model...................................................... 20

Figure 7. List of elements for Corporate Governance (based on Office of the Auditor General of Canada, Dec 2000)........................................ 22

Figure 8. Five domains of IT Governance (ISACA Framework Component Supporting the IT Governance Focus Area, www.isaca.org)............. 24

Figure 9. Five Principles of COBIT 5; Source: COBIT® 5, 2012 ISACA® .... 30

Figure 10. ITIL Service Lifecycle. Source: www.itil.org ITIL 2011 edition..... 33

Figure 11. Microsoft Operations Framework (https://technet.microsoft.com/library/cc506049.aspx)................................................................. 35

Figure 12. Strategy – Tactics – Operations............................................. 40

Figure 13. Separation of Duties control mechanism............................ 41

Figure 14. PRINCE2 process model (official PRINCE2:2009 edition book, OGC 2010)... .................................................................................. 48

Figure 15. Main PMBok Process Model (Source: PMI PMBoK 5 edition) 51

Figure 16. The RUP disciplines.......................................................... 60

Figure 17. MSF processes................................................................. 64
Figure 18. Microsoft Solutions Framework for Agile Software Development......67

Figure 19. The Core Scrum Process............................................................. 71

Figure 20. Creating value and value inhibitors. Source: Thomas and Mullaly, Exploring the dynamics of value and fit: Insights from project management (2009) ............................................................................................ 78

Figure 21. Hybrid solutions for integrating PRINCE2, PMBoK and SCRUM methodologies ............................................................................................................ 79

Figure 22. Technologies which will impact outsourcing decisions. Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey.................................88

Figure 23. Current outsourced services and services planned to be outsourced. Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey..................88

Figure 24. Countries for offshoring and outsourcing activities. Source: Deloitte’s 2014 Global Outsourcing and Insourcing survey......................89

Figure 25. The growth of outsourcing world.............................................. 90

Figure 26. PMI demographic – seven project-intensive industries...........92

Figure 27. PMI pulse – navigating complexity........................................... 96

Figure 28. Mehrabian cycle. Source: Mehrabian, Ferris, 1967 ..........103

Figure 29. Communication tools used by the virtual teams in research study. Source: own work................................................................. 105

Figure 30. Phases of the project’s impact as a function of the number of projects. Source: ICAN Institute................................................................. 114

Figure 31. Sources of innovation. Source: Mark Połczyński, the publication of ICAN Institute ................................................................. 120