

PROJECT MANAGEMENT FOR INCREASING LOGISTICS PRODUCTIVITY IN DIRECTION OF INDUSTRY 4.0

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Abstract

Innovation and technology play an important role in improving productivity in logistics chains. Having enough articles in one's warehouse does not suffice to meet the increasing customer requirements. It is essential for us to have the ability to provide the required components in almost real time without increasing our operational costs of on-time delivery. Industry 4.0 envisions to further eliminate inventory at all levels of supply chain management so as to be able to operate on 100% service level, which necessitates a dramatic reduction in the cycle time of any operation of the warehouse picking process and errorless systems in order to maintain high quality standards throughout the whole process. Systematic and structured project management is a tool that radically upgrades the measures ensuring successful implementation of any contemporary and/or timeless approach towards the betterment of warehouse picking processes. It allows to avoid failure and increases the chances of an efficient implementation.

The aim of this paper is to report on the research into the awareness of 'pick-by systems' and the use of the systematic project management approach, and also to present the results of a survey conducted among logistics specialists and key SCM stakeholders concerning utilization of the project management approach and its successful implementation. Last but not least, the purpose of our research is to develop a project management-based guide plan serving to increase logistics productivity.

Keywords: Project Management, Industry 4.0, Industrial Internet of Things, Pick-by systems, Process Improvement.

1. INTRODUCTION

Both innovation and technology are crucial to enhancing productivity and performance in logistics chains.

The concept of the Industrial Internet of Things (IIoT) and its European equivalent, Industry 4.0, continues to grow. The promise of these strategies is to bring data together in order to deliver actionable results and improve productivity, but the reality of plants today is that there is a widely disparate use of sensors and monitors. [1]

There is no doubt that Industry 4.0. will bring competitive advantage to production, but appropriate implementation together with the convenient project management approach still remain the vital keys to success.

2. DEFINITIONS

2.1. Definition of Supply Chain

In order to facilitate deeper levels of comprehension we can agree upon the following simplified explanation: The term 'logistics' encompasses materials management and distribution alike. Any supply chain comprises suppliers, logistics and customers [2]. A supply chain is "a sequence of processes to add value to the product during its flow and processing of raw materials, through all the intermediate forms, to form in line with end customer requirements"[3].

2.2. Definition of Industry 4.0

Industry 4.0 and Industrial Internet of Things (IIoT) are enabled with connectivity to and from devices (from a sensor to a large-scale control system), data, and analytics. Sensors and systems need connectivity with a greater network to share data; analysis allows people to make informed decisions. [4]

The work pieces of Industry 4.0 are intelligent. They are equipped either with barcodes, RFID chips, or internet-enabled sensors. Thanks to partially or fully automated information gathering and transmission, a virtual copy of the physical world can be created. The network of software programs, mechanical and electronic parts communicates around the world through the Internet. This makes constant coordination and improvements between locations or even beyond the walls of the company possible. [5]

2.3. Definition of Project Management in Industry 4.0

The implementation of any improvement idea resulting from an Industry 4.0 approach ought to be systematic. In general, it should also be compatible with the implementation of any other changes and approaches that are being introduced by a company. From the strategic point of view, the most effective tool for that is a systematic and standardized approach consisting in managing all the principal corporate changes by means of program management. The clear definition of this term is stipulated in the ISO 21 500 standard: "Program management is generally a group of related projects and other activities aligned with strategic goals. Program management consists of centralized and coordinated activities to achieve the goals." [6]

Once well implemented in companies, program management forms an organizational environment which is suitable for the accomplishment of the aforementioned objective including systematic implementation of the ideas related to the Industry 4.0 approach. Those ideas are implemented within a program which can be named 'Industry 4.0' depending on particular projects.

The success of the implementation relies on the premises which are almost under control of (or influenced by) the company management, such as:

- Appropriateness of the project goal for the overall corporate strategy.
- Capability of influencing stakeholders.
- Accessibility of information sources.
- The way projects are managed to provide the deliverables.
- Internal and external technical and nontechnical constraints.

If companies do not have their organizational environment ready for efficient implementation of the objectives and goals they consider as innovative and important for the Industry 4.0 approach, improvement ideas will remain on paper only, and/or their implementation will not bring about the required outcome. After all, the sophisticated approach towards continual improvement called Six Sigma also recommends to implement the chosen improvement activities using a project approach [7].

Our investigation is focused on summarizing the survey results which should provide us with a clear understanding of the answer to the following question: "how well the companies are ready to reflect on the Industry 4.0 challenges". For this purpose, we have determined a set of basic questions that relate to some basic and crucial areas of successful program and project management implementation and use. The data were collected by means of a questionnaire which was sent to managers of industrial and logistics companies. The results of our investigation are presented in the undermentioned parts of this paper.

3. SURVEY RESULTS AS BASIS FOR FURTHER RESEARCH

We decided to carry out our investigation with the aim of revealing how well companies were prepared for systematic implementation of the Industry 4.0 approach. It was with this objective in mind that we addressed

a simple questionnaire to an unknown group created from the list of our contacts. In total, we received back 78 completed and adequate responses.

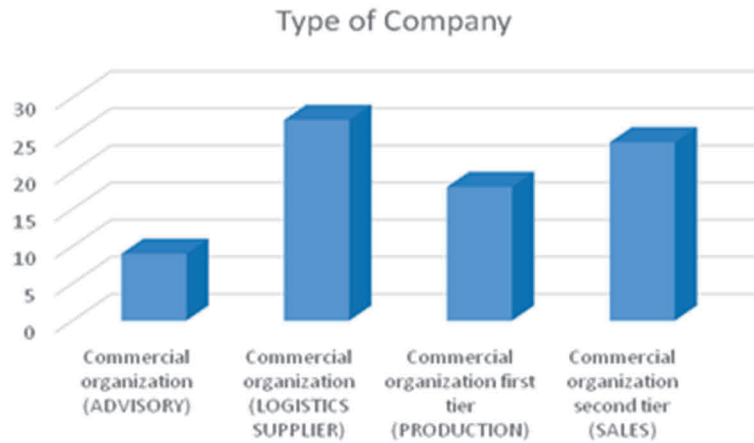


Fig. 1 Responses sorted by type of organization

Out of the total sample, 58 % respondents were from the production industry sector and 31 % from companies specializing in the sale of logistics services (see **Fig. 1**). All of the groups shown in the chart use logistics to become successful in the business they do. From the chart below, we can see that the responses are distributed between aerospace (24 %), automotive (12 %), energy (8 %), high tech (24 %) and transportation (32 %) industries (see **Fig. 2**).

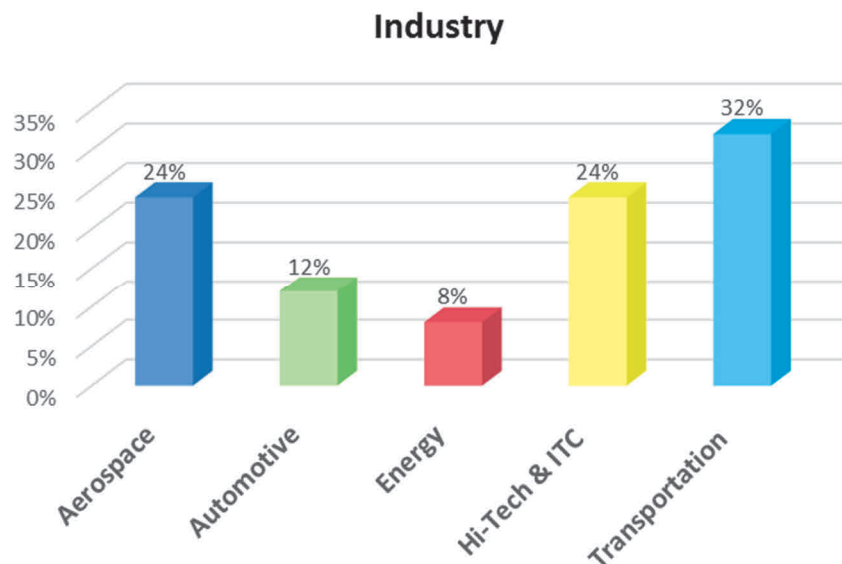


Fig. 2 Responses sorted according to industrial sectors

The next set of questions was aimed at finding out how well the companies were prepared for a systematic implementation of changes by means of project management methods. While 73 % of respondents use project management systematically (see **Fig. 3**), top managers of 81 % of organizations consider project management as a very important management tool and regularly use it in assessing and implementing their projects (see **Fig. 4**).

Does your organization management deal with the new technologies and innovation

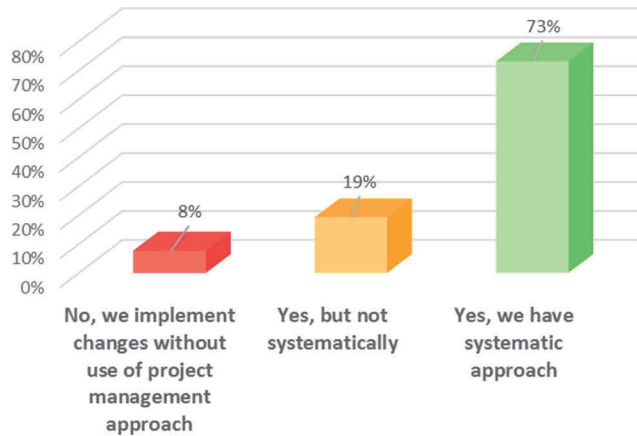


Fig. 3 Responses concerning new technologies and innovation

Organization management consider project management as:

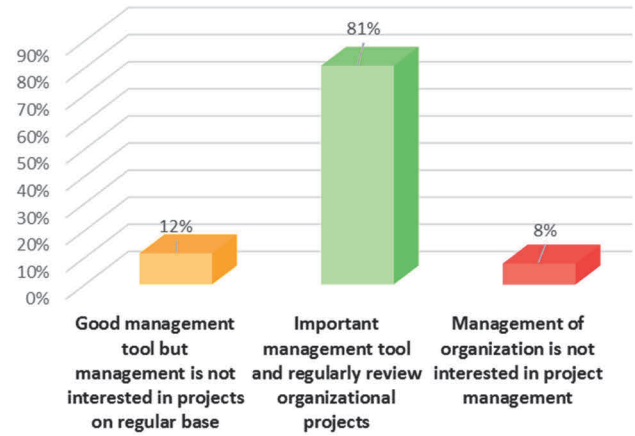


Fig. 4 Responses concerning status of project management

The surveyed organizations use project management especially to implement new solutions (54 %) and to design them (27 %). It is noteworthy that only 19 % of the responding organizations use project management for continual improvement (see Fig. 5).

Phase of change implementation wherein you use project management

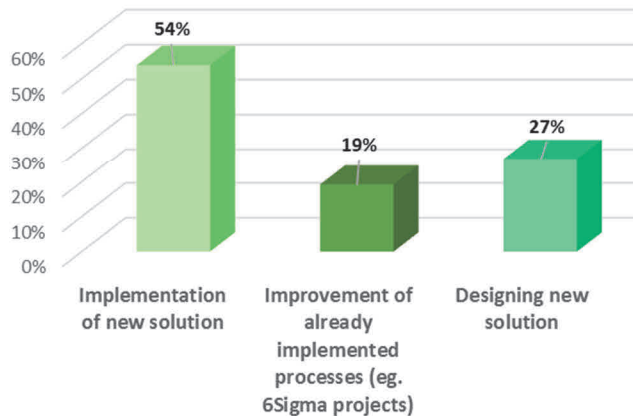


Fig. 5 Phases where Project Management is used

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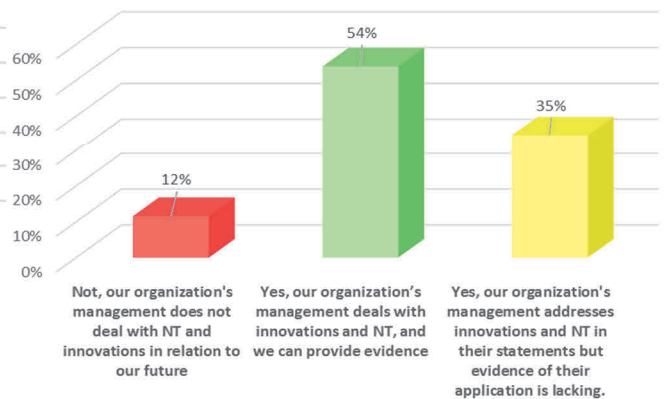


Fig. 6 New technologies (NT) and innovations

Top managers of 54 % of the surveyed organizations regard new technologies as crucial for their company and its success; these enterprises were equally able to present clear evidence thereof. However, in 35 % of the inquired organizations, the management speaks about innovations and new technologies without being able to provide any convincing proof of the results of their application (see Fig. 6).

Sixty-nine percent of organizations look at the innovation process through the prism of future economic benefits (resulting from added value achieved through innovation). Nineteen percent of them introduce innovations because of their ambition to become a market leader while 12 % take aim at immediate economies via actual cost reductions (see Fig. 7).

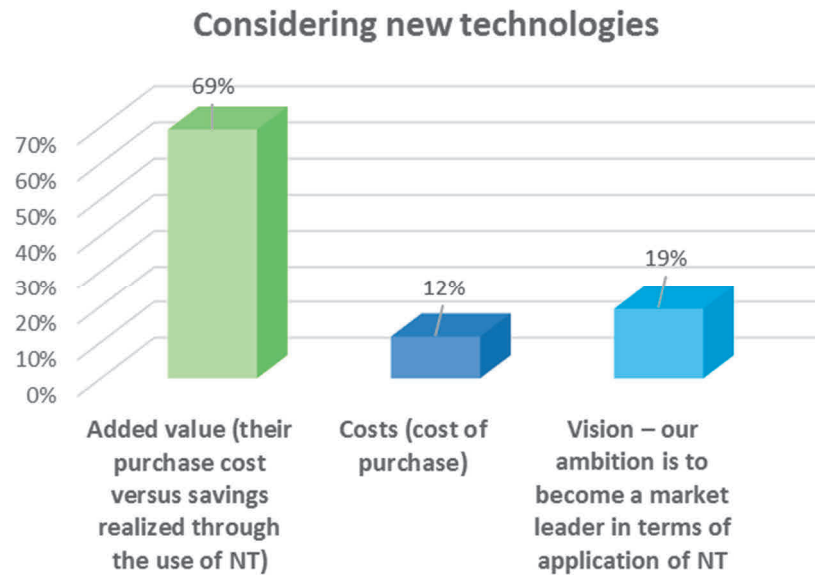


Fig. 7 Consideration of adopting new technologies (NT)

From the supply chain (logistics) point of view, the main benefit is seen - by roughly 42 % of the respondents - in the improvements of IT connectivity (81 %) and in the implementation of modern logistics technologies (PbV, PbL, and automatic storage systems). Only 15 % of the respondents see the future of logistics in 3D printing, which represents an interesting piece of information (see **Fig. 8**).

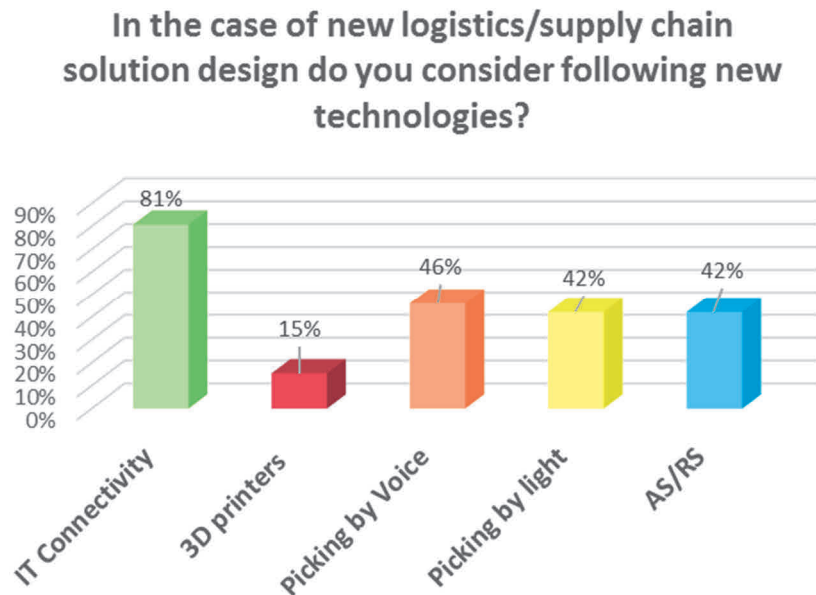


Fig. 8 Consideration of implement NT

Almost 97 % of our respondents use risk management to eliminate the impact of potential threats on the results of innovation projects implemented in the logistics sector. Sixty-five percent of them use risk evaluation in the phase of logistics innovation project planning and 37 % do so in the phase of process monitoring and execution.

The last question, which concerned the importance of project management for innovative processes, was addressed individually to each of our respondents. The good news is that 77 % of them are ‘fans’ of this

approach. Nineteen percent of them view it as a tool which may entail a potential risk to their organization's flexibility and the remaining 4 % do not find project management useful at all.

4. CONCLUSION

Finally, on the basis of the results of our research, we can conclude that the majority of organizations that took part in our survey either consider introducing an innovation or have already been implementing one through a systematic approach (project management). Project management seems to be regarded as an important tool for the implementation of changes in logistics and supply chains. Since they both have a direct influence on a company's success in Industry 4.0 and in its business in general, we can state that focusing on corporate development and improvement of staff competencies appropriate for project management still remain the bulk of the challenge.

ACKNOWLEDGMENTS

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