

# Human factor and LEAN management techniques for improving business management

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## INTRODUCTION

Today world has changed rapidly and we face various challenges: fast changing conditions and uncertainty about the future, technology changes – they have become fast growing and developing, data explosion as we live in the data century. Today very essential becomes performance management – how organizations can adopt quickly to new efficiency and productivity levels. Rises the competence level for managers and leaders as organisations need thinking human capital. Hence the competency for recruiting the right talent becomes very essential. **The aim** of the research is to understand the role of human factors and LEAN management techniques and methods for improving contemporary business management.

The role of human factor in Lean is very important and sometimes Lean production system assures that the humans is the most important element of the organization, but only some researchers emphasizes that Lean implementation causes a decline in their working conditions, for example increase of stress level, psychological discomfort among the workforce. In such situations the most appropriate solution is to involve employees in decision making process, participation in work organization, workplace design planning and development of preventive measures.

## RESULTS

Today's changing work environment is focused on new forms of work organization and cooperation. This dynamic development also requires a different approach to management, imposing additional responsibilities on the human role - the core value of the organization. Employees must be able to predict, dare and act just in time to be ready for the future challenges. In the next decade, digitization will be the most important driver for the business development and new forms of work, including work from home will become very popular to increase work-life balance and efficiency and productivity levels of organisations. This means that organizations need to focus on human factors and LEAN management techniques to achieve high productivity levels. Human factors in combination with LEAN management provide theoretical and practical base for achieving well-being and high efficiency and productivity in organisations, considering the human-environment (technology, tools, workplaces etc.) interaction, learning and creating the principles of technological equipment, environmental and technology design. There are several advantages and side-effects when introducing human factors and LEAN approach (see table 1). Continuous improvement of business operations is essential part and one way to improve operations is to make them safer and more convenient with human factors approach.

## METHODOLOGY

In the research such methods were used: logically constructive method, monographic research method, graphical analysis, comparison method.

**Table 1.** Advantage and side-effects, introducing human factor solutions with LEAN in production technologies

Advantages	Side-effects
<ul style="list-style-type: none"> <li>• Work productivity and process performance increases</li> <li>• Supply period of parts and raw materials decreases</li> <li>• Manual work in moving heavy loads decreases</li> <li>• Rotation of employees is possible</li> <li>• Saved time for frequent hand and leg movements</li> <li>• Number of damaged products and clients' complaints decreases</li> <li>• Amount of spare stocks (raw material, materials, etc.) decreases</li> </ul>	<ul style="list-style-type: none"> <li>• Errors are possible in automated technological system due to corrosion or aging</li> <li>• Investment costs grow</li> <li>• Effect of cognitive ergonomics increases (concentration necessary, incl. visual and hearing load)</li> <li>• Process performance decreases during stoppage of automated line</li> </ul>

## References

1. Freivalds, A., Niebel, B.: Niebel's Methods, Standards, & Work Design. 12th Edition, McGraw-Hill (2009)
2. Babris, S., Kalkis, H., Murnieks, J., Piekuss, U.: LEAN solutions for effective business. Madris, Riga (2016) (in Latvian)
3. Kalkis, H.: Economic Analytical Methods for Work-related MSD Cost Prediction. Elsevier, Procedia Manufacturing. 3, 4181–4188 (2015)
4. Smart, P. K., Tranfield, D., Deasley, P., Levene, R., Rowe, A., Corley, J: Integrating 'Lean' and 'High Reliability' Thinking. Proceedings of the Institution Mechanical Engineers, 217 (5), 733–739 (2003)
5. Cirjaliu, B., Draghici, A.: Ergonomic Issues in Lean Manufacturing. Procedia - Social and Behavioral Sciences. 221, 105–110 (2016)
6. Neumann, W. P.: Inventory of Human Factors Tools and Methods. Ontario Workplace Safety and Insurance Board. (2007)
7. American Society for Quality. Failure mode effects analysis (FMEA). <http://www.asq.org/learn-about-quality/process-analysis-tools/overview/fmea.html> Accessed 15.12.2017 (2021).
8. Kalkis, V. Work Environment Risk Assessment Methods. Fund of Latvian Education, Riga (2008), (in Latvian)

## CONCLUSION, CONTRIBUTION AND NOVELTY

New focus on people as main elements of business systems is the source of quality, productivity, value creation in contemporary organisations. Human factors in combination with LEAN management minimizes waste in operations and overload related to people, and creates consistent work operations with improved production and quality levels, meantime also reducing costs and improving health and safety.

## BIONOTE

**Henrijs Kalkis**, Ph.D. in Management Sciences. Henrijs hold professor position at the University of Latvia, as well as he is co-founder and board member of Latvian Ergonomics Society. Henrijs is certified European ergonomist (Eur.Erg.), council member of International Ergonomics Association (IEA), council member of Federation of the European Ergonomics Societies (FEES), council member of Centre for Registration of European Ergonomists (CREE). He has more than 50 publications in Ergonomics and Business Management journals, 5 books related to research topics. Henrijs Kalkis was Fulbright visiting Scholar at the PennState university, USA.

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