

Structural Co-Existence of Organizations Elder and Younger Employees to Sustain Internal Control and External Transformation In Digital Age: A Review

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Abstract

Efficiencies focus on control aspects and effectiveness focus on transformation aspects. A co-existence of younger and elder employees in an organization on efficiencies and effective lines would create a social, demographic balance within the organization with high productivity indicators which organization can benefit if consciously implemented and sustained. Of the articles identified per keyword, about 5 relevant articles for 10 LOC (Line of Control) and 10 LOT (Line of Transformation) topics were chosen respectively which align with the theme of control/ efficiency and transformation/ effectiveness. The extensive review focus was on the application of particular concept in organization for problem solving or issue resolution either with control/efficiency or transformation/effectiveness perspective. The review findings show that efficiency aspects are more control oriented and effectiveness aspects are transformation oriented. The study concludes that control and efficiency aspect lies with elders or seniors and transformation aspect with youngsters or juniors

Keywords – High productivity, Line of control, Enterprise Resource Planning (ERP), Social Media, Artificial Intelligence,

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INTRODUCTION

Organizations in 21st century have employees of all ages ranging from 18+ till 65+. With a huge knowledge base to run an organization, it has been a challenge to attribute an age factor to organization knowledge base so that the elder and younger employees coexist and they can add great value to the organization in the areas which they can best focus naturally. In an earlier article by the author, the focus was on organizations Line of Control (LOC) and Line of Transformation (LOT) with respect to efficiency / control and effectiveness / transformation. The same concept is extended further to attribute to employees' age factor so that Organizations can consider as a guiding factor for better resource utilization in the Digital era. This conceptually defines two broad paradigms as Line of Control (LOC) for elder employees and Line of Transformation (LOT) for younger employees. The following diagram depicts a conceptual understanding of the positioning of LOC and LOT.

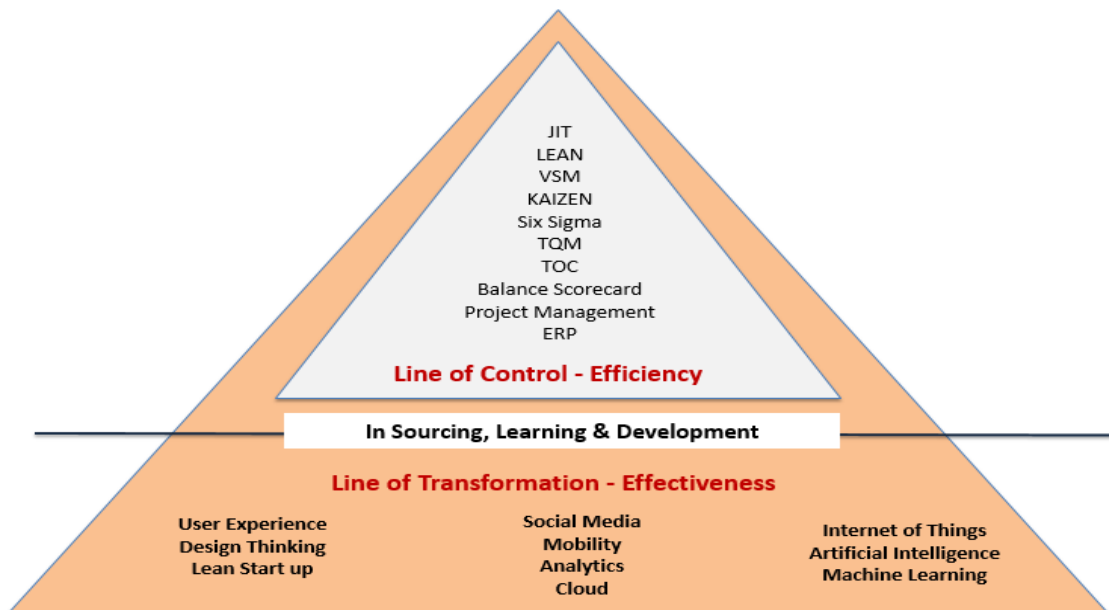


Figure 1 – LOC, LOT and HR Intervention

Existing literature on LOC and LOT

The concepts of Line of Control (LOC) are derived from management control systems. A system which gathers and uses information to evaluate the performance of different organizational resources like human, physical, and financial and also the organization as a whole in light of the organizational strategies pursued. On the other hand, line of transformation (LOT) is derived from Digital Transformation definition, associated with the application of digital technology in all aspects of human society at large (www.wikipedia.org).

In the context of LOC and LOT, there was no literature in the search vicinity which differentiates the control and transformation point of view. Due diligence is done to check if any such literature review is attempted before. Since there was no successful identification of such a review, the author took up the work to bring forth this new concept for the organization with respect to LOC and LOT. However, discretely lots of research is been done in the individual topics of LOC and to a lesser extent in LOT. Sometimes combining 2 or 3 topics are researched together due to their interdependency nature. Author has taken to the review in this backdrop and present findings, discussion, limitations and further research.

METHODOLOGY

A four phase methodology is adopted for the study.

Phase I – Classification of concepts

In this phase, LOC and LOT concepts are chosen on popular adoption in organizations and mention in magazines and literature. Further, instead of spreading thin on multiple databases, a single source database was chosen for all LOC and LOT topics. And the papers were

predominantly the academic journals. www.sciencedirect.com was the online database chosen to identify the research papers for LOC and LOT of various journals. Science direct source was chosen sampling an article for each topic and found that recent year's papers were published and specific to science domain of research and application.

Table 1 – LOC & LOT Concepts with Number of Articles for Review

#	LOC Concepts	Papers	#	LOT Concepts	Papers
1	Just In Time (JIT)	5	1	Social Media	5
2	LEAN	5	2	Mobility	5
3	Value Stream Mapping (VSM)	5	3	Analytics	5
4	KAIZEN	5	4	Cloud Computing	5
5	Six Sigma	5	5	Internet of Things (IOT)	5
6	Total Quality Management (TQM)	5	6	Machine Learning (ML)	5
7	Theory of Constraints (TOC)	5	7	Artificial Intelligence (AI)	5
8	Balance Scorecard	5	8	User Experience (UX)	5
9	Project Management	5	9	Design Thinking (DT)	5
10	Enterprise Resource Planning (ERP)	5	10	Lean Startup Methodology (LSM)	5
	TOTAL	50			50

Phase II – Selection of articles

The reason for choosing 5 articles was actually from identified 10-15 articles for each topic or concept. 5 relevant articles were considered as a reasonable number to review per concept. Also, as the numbers of concepts are 20 in total, a review of 100 articles was felt appropriate for the literature review. For each topic attempt was made to download research topic where the LOC or LOT concept was discussed from a research perspective applying the concept in multiple industries. Where there is a clear source of theory backing of the concept itself and its application as a solution to a problem or an opportunity in efficiency or effective domain, such a paper was considered in this review.

Phase III – Confirmation of Internal and External focus

The guiding force of the literature review was to identify the focus of the concept. For LOC, the focus was to observe if the concept predominantly internally focused either on efficiencies or effectiveness. Although customer focus may be termed as externally focused, in the context of disruptive technology, a mere customer focus is more looked as internal orientation rather than be adaptive rapidly from a digital sense. However, for LOT, the question is with the disruptive technologies at the root, is the focus external or internal was to be determined. The literature review in the next section reveal that the LOC concepts are predominantly internal control oriented and LOT are predominantly external transformation oriented and further the control aspects are better addressed by the elder employees and transformation aspects by the younger employees. The next sections will unfold the same giving sufficient indications which necessitate further research.

Phase IV – Social media survey

A social media survey was conducted on a sample size of 100 respondents to elicit opinion of how elder and younger employees of an organization can be aligned with LOC and LOT aspects. One single question was asked and the response was to answer as agree / disagree.

FINDINGS FROM LITERATURE REVIEW

LINE OF CONTROL

Just In Time Concept (JIT)

Implementation of integrated logistics is a strategy to achieve efficiencies in operative and administrative areas. The focus is on forecasted demand, aggregate planning methodologies, lean manufacturing, JIT, so as to make enterprise more competitive in delivery lead time, improve customer service level and reduce inventory (*Rodolfo et. al. 2015*). In JIT implementation, independent variables can be as organizational commitment, communication channels in organization, empowerment granted to employees, education provided in different organization levels and the capacity to solve problems. On the other hand, dependent variables can be

inventory management, cost, quality as performance indicators (*Jorge Luis Garcí'a Alcaraz et al. 2014*). New JIT consisting of Total Development System (TDS), the Total Production System (TPS), Total Marketing System (TMS), Total Quality Management (TQM) as core elements required for establishing new management technology principles for sales, R&D, design, engineering and production (*Kakuro Amasaka, 2007, 2014*). Integrated supply chain strategy comprises of Total JIT (T-JIT) which incorporates JIT-Production, JIT-Selling, JIT-Purchasing and also JIT-Information (*Kenneth et. al 2013*).

LEAN CONCEPT

Application of lean concepts in product development domain to remove waste at the factory floor has immense value for customers be it in all direct or indirect activities within the product value stream(*Torgeir Welo et al., 2016*). Type of management control practices relate and impact the implementation of corporate lean program at factory level (*Torbjorn et al., 2015*). Lean thinking can be adopted as a holistic business strategy rather than activity isolated in operations (*Rosemary et al., 2014*). Lean management (LM) is a managerial approach for improving processes based on a complex system of interrelated socio-technical practices (*Thomas et al., 2014*). Research on integration of Lean and Green practices have introduced easy to track metric - Carbon-Value Efficiency, adding value to control measures (*Ruisheng Ng et al., 2015*).

Value Stream Mapping (VSM)

Strategies for sustainable manufacturing include lean manufacturing practices and VSM techniques to identify environmental / societal negative impacts or waste (*William and Fazleena, 2014*). Framework of VSM helps to identify current state and future state by development teams brainstorming sessions, Gemba walk could reduce Product Development (PD) lead time to 50% (*Satish et al., 2014*). A VSM method is developed that allows a first quick, easy and comprehensive analysis of energy and material flows within the production process (*Neha and Vinay, 2016*).

KAIZEN

Factors contributing to the successful implementation of Kaizen and its challenges among small and medium enterprises are useful in order to control organization efficiencies from global competitive perspective (*Mohd. and Fatimah, 2016*). Lean management often includes a Kaizen event to facilitate the acceptance of the project by the employees (*Chantal et al., 2015*). For remote care patients, application of Kaizen on future of telemedicine is emphasized to provide high-quality, patient-centered care (*James R. van Dellen, 2016*). A framework which brings both Kaizen and automation together, using an automated simulation model as a process re design to control and can improve labor productivity to 50% (*Jr Jung Lyu, 1996*). Controlling information, knowledge flow between buyers and suppliers on the lines of Kaizen's continuous improvement philosophy, contributes to product co-design and can fulfill potential buyer's requirements for quality, cost and delivery control (*Tomohiro et al., 2015*).

Six Sigma Method

Adherence to Six Sigma method becomes more beneficial for projects that create a lot of knowledge and control project execution (*V. Arumugam et al. 2016*). For environmental sensitive service standards, limitations of green lean approach can be identified and then integration with the six sigma approach can be considered in order to overcome the limitations, and then assess the performance of the green lean approach (*Muhittin and Yigit, 2016*). Six Sigma approach is one of the management control system providing inter disciplinary approach including statistical and operational research (*Muzaffer et al., 2016*). Also, six sigma approach can be applied in complex supply chain inner process with a focus to decrease defects and failures and propose process improvements (*Hikmet and Muhsine, 2015*). Organizational knowledge creation processes positively effects knowledge, in turn positively effects six sigma project success, and six sigma project success leads to improved organizational performance (*Ang Boon Sin et al., 2015*). Six Sigma is an optimization technique. The difference it makes is to be flexible aiming to optimize both the performance and managerial skill (*Ali and Hacer, 2015*).

Total Quality Management (TQM)

There exist inter disciplinary relationship between mediators such as Statistical Process Control (SPC), Lean Production (LP), Total Productive Maintenance (TPM) with respect to organization business performance. Structural Equation Modelling (SEM) are used to examine the relationships of the practices (*Ahmed et al., 2012*). In Small and Medium Enterprises (SME), where the structure of the organization is such that the employees perform multi-tasking, here the TQM is considered for implementation to enhance the quality of manufacturing processes (*Ionela et al., 2015*). TQM is a philosophy that emphasizes process improvement, whereas an ERP system is an IT mechanism that implements enterprise-wide process management (*Ling, et al., 2008*). Strategic planning and human resource management have a positive and significant relationship with the dimensions of Knowledge Management (KM), whereas process management has significant effects on knowledge acquisition and knowledge distribution (*Keng-Boon Ooi, 2014*). Technology/ R&D management is an appropriate resource to be used in harmony with TQM to enhance organizational performance, particularly innovation (*Daniel and Amrik, 2004*).

Theory of Constraints (TOC)

Critical Chain Project Management (CCPM) is a TOC tool, used for planning and project management. The tool can be used both in one-project and multi-project structures where resources are being used in several projects simultaneously (*Azar et al., 2016*). Goldratt's Theory of Constraints (TOC) is to reduce inefficiencies. The Bullwhip Effect is a proven cause of significant inefficiencies in SCM (*Jose et al., 2014*). TOC can be applied in complex scheduling jobs as well. Simulation scenarios are helpful to control Master Production Scheduling (MPS), the role of setup time in scheduling, impact of free products on through put etc (*Davood, 2015*). Increase in throughput mean that the rate at which the company is making money is increasing (*Azar, 2014*). The emphasizes of the Theory of Constraints (TOC) as a management philosophy is on the weakest links/ rings in the process chain to improve the performance of

systems. Companies, whether they are in the production or service sector should be more focused on understanding their own structure in terms of processes to survive in a global competition (Zeynep et al., 2014).

Balance Scorecard

The Sustainability Balanced Scorecard (SBSC) concept is used to assess the perceived importance of relationships between Corporate Social Responsibility (CSR) and business performances to support the goals established (Jin-Su et al., 2015). Considering the extrinsic and intrinsic factors such as companies age, the diversity of products and services, the nature of the ownership structure, the internationalization, and the organizational size, the adoption of BSC can be assessed (Patricia et al., 2016). Through the BSC, an organization monitors and controls both its current performance (finance, customer satisfaction, and business process results) and its efforts to improve processes, motivate and educate employees, and enhance information systems - its ability to learn and improve (Jarosalva et al., 2014). Sustainable design-centered manufacturing (SDM) is to create competitive advantages for future new product development. However, selecting and balancing the indicators for economic, environmental, and social sustainability (3 pillars) is expressed as difficult (Steve H. et al., 2015). It is worth measuring ERP system performance based on its impact to critical performance of an organization as this requires a systematic method that bridges ERP performance measurement and key organizational performance (Yung-Chi et al., 2015).

Project Management

Broader approach to PM maturity assessment can be deduced from Project Management literature. Applying the same might address the criticism regarding the existing models of lower impact on performance on maturity assessment (Mihaly, 2016). Integrated view of PM research in terms of its thematic evolution and trends is necessary for an understanding of future directions and better management and control (Milind and Saji). 19 challenges were identified which are considered to be necessary to address for success of a Global Software Development project

spread across globally (*Mahmood et al., 2016*). To establish multi-cultural PM process, 7 steps can be followed for better control (*Ipek Sahra Ozguler, 2016*). Similar to having enterprise risk management systems and disaster risk management systems and tools, project risk management systems should be available in the organization (*Amir et al., 2015*).

Enterprise Resource Planning (ERP)

One of the key control focuses of ERP implementation is user satisfaction. Top management need to take user support, training, system quality views (*Carlos et al., 2016*). Implementation of ERP with effective communication among departments to meet delivery dates have achieved to reduce work in progress on the shop floor and inventory, integration of firm's activities, intra organizational communication and wider collaboration with other stakeholders (*Ignatio and Charles, 2016*). Focus on end users of ERP is so critical for ERP implementation. Their active participation throughout the implementation phases ensure successful implementation and ensure achievement of objectives (*Samwel and Patrik, 2013*). ERP and BI (Business Intelligence) implementation have been looked as a separate project engagement. Infact ERP provides online transaction process reporting on real time data and BI provides online analytical process reporting on historical data. They service the purpose for operations and strategic decision making respectively. Seamless integration of these two systems would provide a better management control (*Muhammad and Zawiyah, 2013*). Post implementation of ERP, the major issue identified is knowledge transfer and retention from external vendor to internal employee. There can be a process for knowledge transfer from external organizations into organizations based on the model of SECI (socialization, externalization, combination, internalization) (*Saide and Mahendrawath, 2015*).

LINE OF TRANSFORMATION

Social Media

Social media could be a mediator between social psychological predictors of a protest behavior and actual participation in a general political awareness, efficacy, and grievances on movement

support and participation (*Francis et al., 2016*). There are links between social media marketing efforts and their consequences (brand preference, price premium, and loyalty). Brands are measured with social media marketing efforts as a holistic concept that incorporates five aspects (entertainment, interaction, trendiness, customization, and word of mouth) (*Bruno et al., 2016*). Social media can be a moderation tool in emergency management or critical situations to be addressed. Attitudes can be explored as expressed by the emergency service staff towards social media for private and organizational use (*Christian et al., 2016*). Best practices in crisis communication can be specifically through the use of social media (*Xialing et al., 2016*). Social media can be further classified into six categories, namely: (i) social network; (ii) social commerce; (iii) social recruitment; (iv) social management; (v) social loyalty and advocacy; (vi) contact management (*Antonio et al., 2016*).

Mobile Technology

Service Oriented Architecture (SOA) can be used to design the system structure and applied mobile communication technology (IMCT) to develop a mobile roaming sessions of the home care management system (*Mu-Hsing et al., 2016*). Mobile health (mHealth) is an emerging field devoted to the use of mobile and wireless devices to affect health outcomes, health care services, and health research leading to transformation of healthcare services (*Melanie and Heather, 2015*). Japanese workers' total MT usage (i.e., during office and non-office hours) had a positive impact on their work autonomy, which, in turn, led to greater work engagement. Emotional exhaustion was not related to MT usage and in turn contributed to work transformation (*Yuka et al., 2016*). Uses and gratifications (U&G) is an approach with a perspective of media technology to explore consumers' motivations for disseminating sWOM (social word of mouth) in mobile SNSs (social networking sites) based on sequential qualitative and quantitative methods (*Yu-Hsiang Lin, et al., 2016*). Hotels adopt mobile reservation systems; based on a technology-organization environment (TOE) framework, nine factors are hypothesized to explain hotels' adoption of mobile hotel reservation systems (MHRS) (*Yi-Shun Wang et al., 2016*).

Analytics

The findings show BDAC(Big Data Analytics Capability) as a hierarchical model, which consists of three primary dimensions (i.e., management, technology, and talent capability) and 11 sub dimensions (i.e., planning, investment, coordination, control, connectivity, compatibility, modularity, technology management knowledge, technical knowledge, business knowledge and relational knowledge) (*Shahriar et al., 2016*).Analytics can provide insight into healthcare consumers' behaviors and attitudes as critical information in an environment where healthcare delivery is moving rapidly towards patient-centered care (*Eric et al., 2016*). The Big Data phenomenon, the volume, variety, and velocity of data, has impacted business intelligence and the use of information (*Deanne and Victor, 2016*).Online consumer reviews have been studied for various research problems in hospitality and tourism. Social media analytics in hospitality and tourism can be conducted (*Zheng et al., 2016*).Augmented Reality is an immersive analytical tool in the physical world. They present Situated Analytics, a novel combination of real-time interaction and visualization techniques that allows exploration and analysis of information about objects in the user's physical environment (*N.even et al., 2016*).

Cloud Technology

A novel model-driven approach and architecture which secures multi-cloud platforms, enables users to have their own private space and guarantees that application deployments are not only constructed but can also maintain a certain user-required security level (*Kyriakos et al., 2016*).Adopting a design science research approach, solution was developed based around stakeholders' collaborative participation in prototyping and then evaluated the design using focus groups (*Shah et al., 2016*).It has been suggested that the physical location of the control system be moved from that of the machine to a cloud, i.e. Control system as a Service (CSaaS) (*Jan et al., 2016*).Research associated with Big Data in the Cloud will be important topic over the next few years. The topic includes work on demonstrating architectures, applications, services, experiments and simulations in the Cloud to support the cases related to adoption of Big Data

(Victor et al., 2016). A cloud-based mobile e-health calorie system can classify food objects in the plate and further compute the overall calorie of each food object with high accuracy. (Sri Vijay et al., 2016)

Internet of Things

The intelligent building, a major smart city research and development domain, has grown beyond the scope of automation, currently focusing on the occupant centered approaches and the ancillary services offered to the power grid (Georgious et al., 2016). Capability for data analytics is an essential element for IoT service. Also, open ecosystems would help companies provide new integrated service and offer greater value for consumers (Jaehyeon et al., 2016). A simulator supporting IoT applications in cloud environment is highly in demand, and so IOTSim is designed and implemented which supports and enables simulation of IoT big data processing using MapReduce model in cloud computing environment (Xuezhi et al., 2016). The effective delivery of emergency information to elderly people is a challenging task. Resalert offers IoT-enabled emergency information supply chain architecture pattern, IoT device architecture and system architecture (Asif, et al., 2016). Urban poor adopting IoT-based innovations must incorporate the unique characteristics of this segment viz. low levels of technology awareness, social acceptance and consumer need (Abhimanyu et al., 2016).

Machine Learning

Landslide susceptibility assessment of Uttarakhand area of India has been done by applying five ML methods namely Support Vector Machines (SVM), Logistic Regression (LR), Fisher's Linear Discriminant Analysis (FLDA), Bayesian Network (BN), and Naïve Bayes (NB) (Binh et al., 2016) (Jean-Emmanuel et al., 2016). Developing and applying the artificial neural network (ANN) with back propagation learning (BP) algorithm and with extreme learning machine (ELM) can help in order to predict GDP growth rate (Svetlana et al., 2016). ML approaches are increasingly successful in image-based diagnosis, disease prognosis, and risk assessment (Marleen, 2016). Exploring the application of Supervised Machine Learning (SML) can

overcome challenges associated with online data analysis. In SML classifiers are used to categorize and code binary data(Ward *et al.*, 2016).

Artificial Intelligence

Five Artificial Intelligence (AI) methods can be applied to predict the final duration of a project. A methodology that involves Monte Carlo simulation, Principal Component Analysis and Cross-Validation is proposed and can be applied by academics and practitioners (Mathieu and Mario, 2015). Artificial Intelligence has contribution of penetrating extensively the renewable energy aspects for improving the functioning of the systems economically (S.M Zahraee *et al.*, 2016). Artificial Intelligence (AI) can assist developers in dealing with service-oriented design with the positive impact on scalability and management of generic quality attributes. Conceptualized and synthesized analysis of AI research works have aimed at discovering, composing, or developing services (Guillermo *et al.*, 2016). A model can be developed for accurate forecasting of Municipal Solid Waste (MSW) generation that helps waste related organizations to better design and operate effective MSW management systems (Maryam *et al.*, 2016). The future of robots, mechatronics and artificial intelligence, impact man kind in different perspectives. Many items and headlines such as jobless ratio, performance management, CRM Analytics, customer relationship management, sales, strategic planning, mass production, Purchasing Power Parity, GDP, inflation, money, central banks, banking system, coaching, training, accounting, taxes etc. have impactful opportunities and gains with the improvements in Artificial Intelligence and Robotics (Cüneyt Dirican, 2015).

User Experience

“Interplay between User Experience Evaluation and Software Development”, states that the gap between human - computer interaction and software engineering with regard to usability has somewhat been narrowed (Carmelo *et al.*, 2013). There is an emphasis on social network to allow professionals of diverse artistic disciplines to exhibit their work and connect amongst each other. They investigate the network properties of the UX/UI designer subgraph (Susanne *et al.*,

2015). The term, UX, delineates a multifaceted and complicated process that embraces analysis, strategic business branding, planning, concept, and participatory design, and change in modern organizational cultures (*Panagiotis et al., 2012*). UX is a maturing research area pertaining to as well as extending beyond the traditional usability. Issues in the realm of usability may be amplified in UX because of its larger scope (*Effie lai-Chong et al., 2013*). In recent years, user UX and Human Factors (HF) have become key components of many business models, but there are still many technology companies which view UX and HF as less than central to their product's value proposition; and, in extreme cases, they view it as aesthetics and visual design only (*Jennifer and Scott, 2015*).

Design Thinking

DT can foster new approaches to complex and persistent health care problems through human-centered research, collective and diverse team work and rapid prototyping (*Jess et al., 2016*). A new participatory design method, known as DT is used to create an Ecosystem Management (EM) tool called the Great Lakes Aquatic Habitat Explorer. Design workshop survey data found that the methods produced an environment of collaborative learning among participants, including diverse participants, authentic dialog, and creativity (*Robert et al., 2016*). There is a necessity to provide awareness on design of applications and DT to highlight potentials of these innovative management methods and tools to build new organizational capabilities and sustain competitiveness in the challenging business conditions, to improve the welfare of society and create better environment for living (*Tatjane and Inga, 2016*). DT and sustainable business model innovation together focus to refine the creative process of developing sustainable value propositions and improve the overall business modelling process. (*Martin et al., 2016*). DT is a strategy based on user-centric design methods and principles. Integrating responsibility in innovation does not have to become a constraint if it is incorporated as a tool for stimulating the creative capacity of innovation teams (*Xavier and Daphne, 2016*).

Lean Start up

Due to its strategic importance, the overall business model, along with the products and services to be delivered, should be assessed iteratively, defining their importance in respect with the customer needs and expectations (*Andrea et al., 2016*). When it comes to succeeding in developing a business idea, lean startup methodology (LSM) can be adopted. LSM is a methodology that focuses on agile testing and learning cycle to validate hypotheses in the business idea (*Michael et al., 2016*). Hypothesizing of using Lean Startup in the healthcare segment is a way of improving the process of creation and development of new products and services in the industry (*Silva et al., 2015*). Thinking on how to strengthen its open innovation model for the R&D center of a Chinese multinational subsidized in Brazil, they made open innovation as a synonym for its strategy based on partnerships with other companies, universities, and research institutes in Brazil (*Romulo et al., 2015*). Strategy focusing on design-driven innovation can help startups in creating design concepts or business innovators to promote the growth of companies so sustainable in its market, where competition is fierce and full (*Isabela et al., 2015*).

DISCUSSION

The following is the synthesis of the review from the articles for each concept of LOC and LOT. Focus of JIT is on efficiencies in operations administration, competitiveness due to internal efficiencies with management commitment and education for employees. The focus of LEAN is on waste removal in the process for value creation, improving of operational performance. Removal of non-value added activities on one hand and focus on value added activities on the other along with visual presentation would sustain the VSM objectives. Control element can be seen in KAIZEN with employee inclusiveness in the event, good communication between top management and employees, focus on resistance to change, impact on culture by big picture communication by change management with a purpose orientation. Precision on control can be seen in alignment of project goals, extensive SIX SIGMA and knowledge creation and training. An in-house employee takes TQM as a base and reflects quality orientation in all other

optimization techniques or subjects. Focusing on the weakest link in the project progress with a focus on resources impact, TOC unleashes the in efficiencies at man-machine interfaces. Measuring operational aspects to sync up with corporate goals, BALANCE SCORECARD brings in operational goals aligned to in house resources and give a holistic measure across organizations communicating individuals impact on critical focus areas and take control on actions. To be executed well within constraints, project management discipline necessitates efficient in house resources to undertake the project goals considering risks & execute within budget allocated and a high degree of control need to be exercised to avoid any schedule or cost variances. Implementation of ERP as a tool to bring in business process re-engineering is a resource intensive engagement at corporate level.

Social media embraces extended stakeholders who influence effectiveness of decision making. Agnostic devices, mobile and instantaneous communication with customers, vendors, service providers in real time is a transformational service an organization can provide in the disruptive era. Mobile technology is transformational concept for any organization in the digital and disruptive era. Generation of huge amount of data by man or machine necessitates data analytics and resources to be skilled in analytics and inference with respect to decision making as different stages of end to end engagement with customers, vendors, service providers etc. Cloud technology enables infrastructural transformation on consolidation and simplification. It connects with other SMAC (Social Media, Mobility, Analytics, Cloud) technologies to play its part in sustainable organization transformation. Opportunity identification, preventive maintenance, proactiveness in service provision are some of sensor based IOT's transformation work areas which require a different culture in the organization and so the in house resource orientation towards transformation mind set. Applications of machine learning found in landslides, radiation oncology, and image based diagnosis, together with cloud, big data and other disciplines of transformation, algorithm of machine learning are bound to increase and applications are set to grow. On the basis of machine learning, artificial intelligence takes over to take chances on decision making by machines on the lines of human cognitive patterns. Service oriented designs can be worked out. Human factors considerations in use of a product is a new emergent concept which the product companies need to take into account as a feedback and for follow up

decision's to sync up with user experience. Human centered research and solutions with rapid prototyping for innovation aligns well with user experience. Multi stakeholder harmony is one of the aims of design thinking. With a concept of Minimum Viable Product (MVP), especially for startups to progress on a solution weather to pivot or persevere, the focus of lean startup itself is on developing business idea on agile methods contributing to organization transformation.

So, what comes out of this study is that, organizations in Digital era need to appreciate concepts of control and concepts of transformation together at same time. It is an organizations strategic intervention along with Human Resources Department (HRD) which needs to assess organizations readiness of its employee's capability with control and transformation aspects. And therefore, it seems that the elder employees with experience or training are better suitable for control aspects rather than on transformation aspects. Similarly, the younger employees are better suitable for transformation aspects than on control aspects. Organizations learning & development department can formulate job descriptions in such a manner that best of employee allocation based on age, experience can be attributed to control and transformation aspects respectively.

The following was the social media survey question and result.

In an organization, JIT, LEAN, VSM, KAIZEN, SIX SIGMA, TQM, TOC, BALANCE SCORECARD, PROJECT MANAGEMENT, ERP are better handled by elder/ senior resources. And SOCIAL MEDIA, MOBILTY, ANALYTICS, CLOUD, IOT, ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, USER EXPERIENCE, DESIGN THINKING, LEAN STARTUP are better handled by younger/ junior resources. Respond "Agree" or "Disagree".	Agree	70%
	Disagree	30%

Research Gap and Future Direction

This literature survey is confined to one database i.e. sciencedirect.com but several journals from it. Other database such as JStor, Emerald etc. might be reviewed for each topic to get a better sense of insights on control and transformation aspects.

CONCLUSIONS AND LIMITATIONS

An organization consists of all employees of all employable ages. With rapid technology changes coupled with complexity like never before, it is in the best social, behavioral and biological interest of human endeavor that control aspects of an organization is best addressed by elder organization resources and transformation aspects addressed by the younger resources to have a semblance and harmony in organization and co-exist to make the best of not just data and information but also of knowledge and wisdom. Although a quick social media survey of 100 sample revealed alignment with the theme, a more in depth study is necessary to carry out to explore further dimensions in this in this regard.

REFERENCES

- Abbasi, M., Hanandeh, A.E. (2016). Forecasting municipal solid waste generation using artificial intelligence modelling approaches. *Waste Management* 56, 13–22.
- Ahmad, M.F., Zakuan, N., Jusoh, A. and Takala, J. (2012). Relationship of TQM and Business Performance with Mediators of SPC, Lean Production and TPM. *Procedia - Social and Behavioral Sciences* 65, 186 – 191.
- Akter, S., Wamba,S.F., Gunasekaran, A., Dubey,R., Childe. S.J. How to improve firm performance using big data analytics capability and business strategy alignment? *Int. J. Production Economics* 182(2016)113–131.
- Alcaraz, A.L.G., Maldonado, A.A., Iniesta, A.A., Robles, G.C., Hernandez, G.A. (2014). A systematic review/survey for JIT implementation: Mexican maquiladoras as case study. *Computers in Industry* 65, 761–773.
- Ali, N.B., Petersen, K., Schneider, K. (2016). FLOW-assisted value stream mapping in the early phases of large-scale software development. *The Journal of Systems and Software* 111, 213–227.
- Amasaka, K. (2007). Applying New JIT—Toyota’s global production strategy: Epoch-making innovation of the work environment. *Robotics and Computer-Integrated Manufacturing* 23,

285–293

Amasaka, K. (2014). New JIT, New Management Technology Principle: Surpassing JIT. *Procedia Technology* 16,1135 – 1145.

Ardito, C., Buono, P., Caivano, D., Costabile, M. F. (2014). Investigating and promoting UX practice in industry: An experimental study. *Int. J. Human-Computer Studies* 72, 542–551.

Arumugam,V., Antony,J., Linderman, K. (2016). The influence of challenging goals and structured method on Six Sigma project performance: A mediated moderation analysis. *European Journal of Operational Research* 254,202–213

Barila, C., Gascon,V., Miller, J., Côté, N. (2016). Use of a discrete-event simulation in a Kaizen event: A case study in healthcare. *European Journal of Operational Research* 249, 327–339

Bibault, J.E., Giraud, P., Burgun, A. (2016). Big Data and machine learning in radiation oncology: State of the art and future prospects. *Cancer Letters* 382 (2016) 110–117.

Bortolotti, T., Boscarri, S., Danese, P. (2015). Successful lean implementation: Organizational culture and soft lean practices. *Int. J. Production Economics*160, 182–201.

Changa, C., Ramachandran, M., Wills, G., Walters, R. J., Li, C.S., Watters, P. (2016). Editorial for FGCS special issue: Big Data in the cloud. *Future Generation Computer Systems* 65, 73–75.

Costa, C.J., Ferreira, E., Bento, F., Aparicio, M.(2016). Enterprise resource planning adoption and satisfaction determinants *Computers in Human Behavior* 63, 659-671.

Costas, J., Ponte, B., Fuente,D.D.L., Pino, R., Puche, J. (2015). Applying Goldratt’s Theory of Constraints to reduce the Bullwhip Effect through agent-based modeling. *Expert Systems with Applications* 42, 2049–2060.

Davood Golmohammadi(2015). A study of scheduling under the theory of constraints. *Int. J. ProductionEconomics*165, 38–50.

Dellen, J. R.V. (2016). The Philosophy of Kaizen and Telemedicine. Commentary on: Neurosurgery and Telemedicine in the United States: Assessment of the Risks and Opportunities by Kahn et al. *World Neurosurg* 89:133-138.

Dirican, C. (2015). The Impacts of Robotics, Artificial Intelligence On Business and Economics. *Procedia - Social and Behavioral Sciences* 195 564 – 573.

El Sayed,N.A.M., Bruce H.(2016). Thomas, Kim Marriott, Julia Piantadosi, Ross T. Smith. Situated Analytics: Demonstrating immersive analytical tools with Augmented Reality. *Journal of Visual Languages and Computing* 36, 13–23.

Erbiyika, H., Saru, M. (2015). Six Sigma Implementations in Supply Chain: An Application for an Automotive Subsidiary Industry in Bursa in Turkey. *Procedia - Social and Behavioral Sciences* 195, 2556 – 2565.

Erdogan,A., Hacer,C. (2015). Literature Search Consisting of the Areas of Six Sigma’s Usage. *Procedia - Social and Behavioral Sciences* 195, 695 – 704.

Ertürk, M., Tuerdi, M., Wujiabudula, A. (2016). The Effects of Six Sigma Approach on Business Performance: A Study of White Goods (home appliances) Sector in Turkey. *Procedia - Social and Behavioral Sciences* 229, 444 – 452.

- Fabrício, R.S., R. da Silva, F., Simões, E., Galegale, N.V., Akabane, G.K. (2015). Strengthening of Open Innovation Model: using startups and technology parks. *IFAC-Papers Online* 48(3),014–020.
- Faulkner, W., Badurdeen, F., (2014). Sustainable Value Stream Mapping (Sus-VSM): methodology to visualize and assess manufacturing sustainability performance. *Journal of Cleaner Production* 85 (2014) 8e18.
- Fraser, J. Plewes, S. (2015). Applications of a UX maturity model to influencing HF best practices in technology centric companies – Lessons from Edison. *Procedia Manufacturing* 3 (2015) 626 – 631.
- Fujimoto, Y., Ferdous, A.S., Sekiguchi,T., Sugianto, L.F.(2016). The effect of mobile technology usage on work engagement and emotional exhaustion. in Japan. *Journal of Business Research* 69, 3315–3323.
- Fullerton, R., Kennedy, F.A., Widener, S.K. (2014). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices. *Journal of Operations Management* 32,414–428.
- Geissdoerfer, M., Bocken, N.M.P., Hultink, E.J. (2016). Design thinking to enhance the sustainable business modelling process e A workshop based on a value mapping process. *Journal of Cleaner Production* 135, 1218-1232.
- Ghezzi, A., Gastaldia, L., Lettieria, E., Martini, A., Corso, M. (2016). A role for startups in unleashing the disruptive power of social media. *International Journal of Information Management* 36 1152–1159.
- Gill, A.S., Phenol,N., Lane, D., Phuong, V.L. (2016). Iota-enabled emergency information supply chain architecture for elderly people: The Australian context. *Information Systems* 58,75–86.
- Girgentia, A., Pacificia, B., Ciappia, A., Giorgetta, A. (2016). An Axiomatic Design approach for customer satisfaction through a Lean Start-Up framework. *Procedia CIRP* 53, 151 – 157.
- Godey, B., Manthiou, A., Pederzoli, D., Rokk, J., Aiello, G., Donvito, R., Singh, R. (2016). Social media marketing efforts of luxury brands: Influence on brand equity and consumer behavior. *Journal of Business Research* 69, 5833–5841.
- Goodspeed, R., Riseng, C., Wehrly, K., Yin,W., Mason,L., Schoenfeldt, B. Applying design thinking methods to ecosystem management tools: Creating the Great Lakes Aquatic Habitat Explorer.
- Gorog, M. (2016). A broader approach to organisational project management maturity assessment. *International Journal of Project Management* 34, 1658–1669.
- Green, K. W., Inman, R.A., Birou, L., Whitten, D. (2014). Total JIT (T-JIT) and its impact on supply chain competency and organizational performance. *Int. J. Production Economics* 147, 125–135.
- Halstead, S., Serrano, H.D., Proctor, S. (2015). Finding Top UI/UX Design Talent on Adobe Behance. 51, 2426–2434.
- Hingle, M., Patrick, H. (2016). There Are Thousands of Apps for That: Navigating Mobile Technology for Nutrition Education and Behavior. *J Nutr Educ Behav*, 48,213-218.
- Izmailo, A., Korneva, D., Kozhemiakin, A. (2016). Effective Project Management with Theory of Constraints. *Procedia - Social and Behavioral Sciences* 229, 96 – 103.

- Izmailov, A.(2014). If your company is considering the Theory Of Constraints. *Procedia - Social and Behavioral Sciences* 150, 925 – 929.
- Jaehyeon Jua, Mi-Seon Kima, Jae-Hyeon Ahn(2016). Prototyping Business Models for IoT Service. *Procedia Computer Science* 91, 882 – 890.
- Kadarova, J., Durkačova,M., Lenka Kalafusova. L. (2014). Balanced Scorecard as an issue taught in the field of Industrial Engineering. *Procedia - Social and Behavioral Sciences* 143, 174 – 179.
- Kanga, J.S., Chiangb, C.F., Huangthanapanc, K., Downinga, S. (2015). Corporate social responsibility and sustainability balanced scorecard: The case study of family-owned hotels. *International Journal of Hospitality Management* 48, 124–134.
- Khameneha, A. H., Taheri, A., Ershadi, M. (2016). Offering a framework for evaluating the performance of project risk management system. *Procedia - Social and Behavioral Sciences* 226, 82 – 90.
- Kritikos, K., Kirkham, T., Kryza, B., Massonet, P. (2017). Towards a security-enhanced PaaS platform for multi-cloud applications *Future Generation Computer Systems* 67,206–226.
- Kuo, M.H., Wang, S.L., TuChen, W. (2016). Using information and mobile technology improved elderly home care services. *Health Policy and Technology* 5, 131–142.
- Larson, D., Chang, V. (2016). A review and future direction of agile, business intelligence, analytics and data science. *International Journal of Information Management* 36, 700–710.
- Lawa, E.L.C.,Schaik, P., Roto, V. (2014). Attitudes towards user experience(UX) measurement. *Int. J. Human-ComputerStudies*72, 526–541.
- Lee, F.L.F.,Hsuan-Ting Chen, H.T., Chan, M.(2017). Social media use and university students' participation in a large-scale protest campaign: The case of Hong Kong's Umbrella Movement. *Telematics and Informatics* 34, 457–469.
- Li, L., Markowski,C., Xu, L., Markowski, E. (2008). TQM—A predecessor of ERP implementation. *Int. J. Production Economics* 115, 569–580.
- Lilis, G., Conus,G., Asadi, N., Kayal, M. (2016). Towards the next generation of intelligent building: An assessment study of current automation and future IoT based systems with a proposal for transitional design. *Sustainable Cities and Society*.
- Lin, X., Spence, P.R., Sellnow, T.L., Lachlan, K.A. (2016). Crisis communication, learning and responding: Best practices in social media. *Computers in Human Behavior* 65, 601-605.
- Lin, Y.H., Hsu, C.L., Chen,M.F., Fang, C.H. (2016). New gratifications for social word-of-mouth spread via mobile SNSs: Uses and gratifications approach with a perspective of media technology. *Telematics and Informatics*.
- Lyu, J.J. (1996). Applying Kaizen and Automation to Process Reengineering. *Journal of Manufacturing Systems*, 15(2).
- Maarof, M.G., Mahmud, F. (2016). A Review of Contributing Factors and Challenges in Implementing Kaizen in Small and Medium Enterprises. *Procedia Economics and Finance* 35, 522 – 531.
- Madanhirea, I., Mbohwa, C. (2016). Enterprise resource planning (ERP) in improving operational efficiency: Case study. *Procedia CIRP* 40, 225 – 229.
- Marleen de Bruijne(2016). Machine learning approaches in medical image analysis: From detection to diagnosis. *Medical Image Analysis* 33, 94–97

- Matendela, S. and Ogaob, P. (2013). Enterprise Resource Planning (ERP) System Implementation: A case for User participation. *Procedia Technology* 9, 518 – 526.
- Mendez, R.R., Patrída,D.S., Flores, J.L.M., Barron, E. A. (2015). A case study: SMED & JIT methodologies to develop continuous flow of stamped parts into AC disconnect assembly line Schneider Electric Tlaxcala plant. *IFAC-Papers On Line* 48(3),1399–1404
- Miah, S.J., Hasan, J., Gammack, J. G. (2017). On-Cloud Healthcare Clinic: An e-health consultancy approach for remote communities in a developing country. *Telematics and Informatics* 34, 311–322.
- Milind Padalkar, Saji Gopinath. Six decades of project management research: Thematic trends and future opportunities.
- Mladenovi, S.S., Milovancevi, M., Mladenovi, I., Alizamir, M. Economic growth forecasting by artificial neural network with extreme learning machine based on trade, import and export parameters.
- Moroni, I., Arruda, A., Araujo, K. (2015). The design and technological innovation: how to understand the growth of startups companies in competitive business environment. *Procedia Manufacturing* 3, 2199 – 2204.
- NG, R., Low,J.S.C., Song, B. (2015). Integrating and implementing Lean and Green practices based on proposition of Carbon-Value Efficiency metric. *Journal of Cleaner Production* 95,242-255.
- Nirwana, M.D., Dhewantob, W.(2015). Barriers in Implementing the Lean Startup Methodology in Indonesia – Case Study of B2B Startup. *Procedia - Social and Behavioral Sciences* 169, 23 – 30.
- Nofal, M.I., Yusof, Z.M. (2013). Integration of Business Intelligence and Enterprise Resource Planning within Organizations. *Procedia Technology* 11, 658 – 665.
- Ooi, K.B. (2014). TQM: A facilitator to enhance knowledge management? A structural analysis. *Expert Systems with Applications* 41, 5167–5179.
- Ozguler, I.S. (2016). Increase the projects' success rate through developing multi-cultural project management process. *Procedia - Social and Behavioral Sciences* 226, 236 – 242.
- Pavie, X., Carthy, D., (2015). Leveraging uncertainty: a practical approach to the integration of responsible innovation through design thinking. *Procedia - Social and Behavioral Sciences* 213, 1040 – 1049.
- Peddi, V.B., Kuhada,P., Yassine,A.S., Pouladzadeh,P., Shirmohammadia, S., Shirehjini, A.A.N. (2017). An intelligent cloud-based data processing broker for mobile e-health multimedia applications. *Future Generation Computer Systems* 66, 71–86.
- Pham, B. T., Pradhan, B., Bui, D. T., Prakash, I., Dholakia, M. B. (2016). A comparative study of different machine learning methods for landslide susceptibility assessment: A case study of Uttarakhand area (India). *Environmental Modelling & Software* 84, 240-250.
- Prajogo, D. I., Sohal, A. S. (2006) .The integration of TQM and technology/R&D management in determining quality and innovation performance. *Omega* 34, 296 – 312.
- Quesadoa,P.R., Guzmánb, B., Rodrigues, L.L. (2016). Extrinsic and intrinsic factors in the Balanced Scorecard adoption: An empirical study in Portuguese organizations. *European JournalofManagementandBusinessEconomics*25,47–55.
- Rahani, A.R., Ashraf, M. (2012). Production Flow Analysis through Value Stream Mapping: A Lean Manufacturing Process Case Study. *Procedia Engineering* 41, 1727 – 1734.

- Reuter, C., Ludwig, T., Kaufhold, M. A., Spielhofer, T. (2016). Emergency services attitudes towards social media: A quantitative and qualitative survey across Europe. *Int. J. Human-Computer Studies* 95, 96–111
- Roberts, J. P., Fisher, T. R., Bridge, M. J.T., Bent, C. (2016). A design thinking frame work for health care management and innovation. *Healthcare* 4, 11–14.
- Rodríguez, G., Soria, A., Campo, M. (2016). Artificial intelligence in service-oriented software design. *Engineering Applications of Artificial Intelligence* 53, 86–104.
- Roya A., Alzola, A., Kumar, A. (2016). Disruption of things: a model to facilitate adoption of Iota-based innovations by the urban poor. *Procedia Engineering* 159, 199 – 209.
- Sagnak, M., Kazancoglu, Y. (2016). Integration of green lean approach with six sigma: an application for flue gas emissions. *Journal of Cleaner Production* 127, 112–118.
- Saide, M. E.R. (2015). Knowledge Management Support For Enterprise Resource Planning Implementation. *Procedia Computer Science* 72, 613 – 621.
- Sandra, S. E. P., Calado, R. D., Silva, M. B., Nascimento, M. A. (2013). Lean Startup applied in Healthcare: A viable methodology for continuous improvement in the development of new products and services.
- Schlechtendahl, J., Kretschmer, F., Sang, Z., Lechler, A., Xu, X. (2017). Extended study of network capability for cloud based control systems. *Robotics and Computer - Integrated Manufacturing* 43, 89–95.
- Shena, Y.C., Chen, P.S., Wang, C.H. (2016). A study of enterprise resource planning (ERP) system performance measurement using the quantitative balanced scorecard approach. *Computers in Industry* 75, 127–139.
- Şimşit, Z.T., Günay, N.S., Vayvay, O. (2014). Theory of Constraints: A Literature Review. *Procedia - Social and Behavioral Sciences* 150, 930 – 936.
- Sin, A. B., Zailani, S., Iranmanesh, M., Ramayah, T. (2015). Structural equation modelling on knowledge creation in Six Sigma DMAIC project and its impact on organizational performance. *Int. J. Production Economics* 168, 105–117
- Swenson, E.R., Bastian, N., Nembhard, H. B. (2016). Data analytics in health promotion: Health market segmentation and classification of total joint replacement surgery patients. *Expert Systems with Applications* 60 118–129.
- Tisca, A. L., Cornu, G., Diaconu, N., Dumitrescu, C. D. (2015). Diagnosis, risk and efficiency in the implementation of TQM in small and medium enterprises. *Procedia Economics and Finance* 26, 215 – 218.
- Tomohiro, M., Tsuji, M., Ueki, Y. (2016). Does Kaizen create backward knowledge transfer to Southeast Asian firms? *Journal of Business Research* 69, 1556–1561.
- Torbjorn, H. N., Jason, D. S., Ferdows, K. (2015). Implementing corporate lean programs: The effect of management control practices. *Journal of Operations Management* 36, 90–102.
- Tyagi, S., Choudhary, A., Cai, X., Yang, K. (2015). Value stream mapping to reduce the lead-time of a product development process. *Int. J. Production Economics* 160, 202–212.
- Verma, N., Sharma, V. (2016). Energy Value Stream Mapping a Tool to develop Green Manufacturing. *Procedia Engineering* 149, 526 – 534.
- Volkova, T., Jakobson, I. (2016). Design thinking as a business tool to ensure continuous value generation. *Intellectual Economics* 10, 63–69.

- Wang, S, H., Chang, S.P., Williams, P., Koo, B., Qu, Y.R. (2015). Using Balanced Scorecard for Sustainable Design Centered Manufacturing, 1, 181–192.
- Wang, Y.S., Hsien-Ta Li, H.T., Li,C.R., Zhang, D.Z.(2016). Factors affecting hotels' adoption of mobile reservation systems: A technology-organization-environment framework. *Tourism Management* 53,163-172.
- Wautersa, M., Vanhouckea, M. (2016). A comparative study of Artificial Intelligence methods for project duration forecasting. *Expert Systems with Applications* 46, 249–261.
- Welo, T., Ringen, G. (2016). Beyond waste elimination: Assessing lead practises in product development. *Procedia CIRP* 50, 179 – 185.
- [Wikipedia. https://en.wikipedia.org/wiki/Management_control_system_and_other_LOC_and_LOT_definitions.](https://en.wikipedia.org/wiki/Management_control_system_and_other_LOC_and_LOT_definitions)
- Xiang, Z., Qianzhou, Y. M., Fan, W. (2017). A comparative analysis of major online review platforms: Implications for social media analytics in hospitality and tourism. *Tourism Management* 58, 51-65.
- Zaharias,P., Mehlenbacher, B. (2012). Exploring User Experience (UX)in virtual learning environments. *Int. J. Human-Computer Studies*70, 475–477.
- Zahraee, S.M., Assadi,M.K., Saidur, R. (2016). Application of Artificial Intelligence Methods for Hybrid Energy System Optimization. *Renewable and Sustainable Energy Reviews* 66, 617–630.
- Zoonen, W.V., Toni, G. L.A., Meer, V.D.(2016). Social media research: The application of supervised machine learning in organizational communication research. *Computers in Human Behavior* 63, 132-141.