Industrial Engineering Letters
ISSN 2224-6096 (Paper) ISSN 2225-0581 (online)
Vol.6, No.1, 2016
www.iiste.org

Projects Never Fail: A Critical Review on Estimation of Project Scheduling and Project Costing

Ahtisham Haider[1] Hussain Ahmad[1] Khawaja Umer[1] Abdul Ahad[1] Muhammad Nouman Shafique[2]
1. Department of Business Administration, FUUST Islamabad
2. Ph.D Scholar Preston University Islamabad, Pakistan

Abstract
Uncertainty remains common in all projects. It is need to realize this uncertainty and have to minimize the effect of this uncertainty to achieve better project outcomes. To realize the project on truthful base it is required to develop project schedule and estimate project costing on reality bases. A lot of project scheduling and costing techniques and tools are used to measure the accuracy. The new systematic techniques increase project outcomes and also reduce the uncertainty from the projects. This study will leads to examine thoroughly project scheduling and project costing. Then this study will guide project managers how to develop a project schedule and what factors are effecting on the project scheduling and a sample project schedule will also provide for project managers and students of project management. After that the major sources of project costing and the method to calculate the project cost will also provide. And the sample project costing sheet is also develop in this study. Both project scheduling and project costing will develop the professionalism among project managers and students of project managers which they can never think before this study and also enhance project outcomes.
Keywords: Project Scheduling, Project Costing, Uncertainty Handling and Project Success

Introduction

Globalization has introduce the new concepts in the project to manage them in better and systematic way but at the same time is high at all stages of project. But level of uncertainty is different at each stage (Huang & Zhao, 2014). At the initial stage or startup of project the uncertainty is very high due to many factors like unawareness of the nature of asset, the method of achieving the asset, and the delivery of asset are unclear at the start of projects because project managers and contractors have less knowledge about asset obtaining and asset management and they are not aware about goals clearly and specifically (Turner, Huemann, Anbari, & Bredillet, 2010).

As the uncertainty increases than automatically chances to decrease in the efficiency and outcome of project. Managers should aware about all the external factors like technology, economic conditions, political and legal environment should consider as uncertainty factors which are beyond the control of project managers and contractors to handle them (Maheswari, Charlesraj, Goyal, & Mujumdar, 2015). They are only create disturbance in the smooth flow of projects. These factors are effecting on the each stage and level of project because they are effecting on the project throughout the life cycle of project (Thibodeau, Monette, & Glaus, 2014).

Uncertainties in projects are not only interlinked with external factors but at the same time project uncertainty is interlinked with internal factors. These uncertainties in the projects will leads to irrational management decisions which will leads to decrease the efficiency and outcomes of projects (Turner et al., 2010). Because project managers took biased decisions on the basis of inconsistent data. Data consistency plays major role in right management decisions. If project managers took decisions on vague and non-relevant data they are unable to take right decision (Tsai, Yang, Chang, & Lee, 2014).

Project outcomes can be measured through the productivity of labor as well as productivity of machine. The productivity of machine is interlinked with the reliability of machine as well as the working conditions on the machine (Settanni, Newnes, Thenent, Parry, & Goh, 2014). If machine are more reliable and the working conditions on machine is also suitable and comfortable for labor then the productivity and outcome of project will increases. Project outcome will leads to define and scope of project. If the project outcome is measured and implement in different aspects it will automatically enhance the scope of project (Li & Womer, 2015).

Project scheduling and project costing are the two major factors in the success of many projects especially in the complex projects like construction projects. If any uncertainty in project scheduling and project costing is occurred it will leads to create hindering in the success of projects (Bukata, Šůcha, & Hanzálek, 2015). Because in complex projects, project scheduling like the completion of project as well as the completion of the different project activities plays their important role in success of project. If all the activities of projects are completed on time than the delivery of project will be on expected time. But if any uncertainty occurred during project scheduling then it will leads to fail the projects (Kellenbrink & Helber, 2015).

At the same time success of project is related with project costing. Because most of the management decisions are interlinked with project costing. If the project costing is unrealistic then the projects will becomes fail (Shahsavar, Najafi, & Niaki, 2015). Project costing is based on capital investment, running expenses, expected cash flows and final costing of any project. All the costs should be dual checked before to interpret and

have to minimize the level of uncertainty of any project. Project costing and project scheduling are the endogenous as well as exogenous factors in the validation of any project because both of them are playing their role in the project success as the back bone of every project (Zheng & Wang, 2015).

It is very critical to realize to accurately measure project costing as well as the right project scheduling because always remains the factor of uncertainty among project costing and project scheduling remains in each project (Okubo et al., 2015). A lot of project management programs and applications minimize the level of uncertainty in developing and measuring project scheduling and project costing but they only provide the frame and infrastructure because these programs are not enough artificial intelligent to took right decision at right time within the limited budget (Cheng, Fowler, Kempf, & Mason, 2015).

This study will focus on the project scheduling and project costing in the success of each project. Because if the project is schedule through scientific methods and project is costing rightly then the project will become successful (Shou, Li, & Lai, 2015). The basic aim of this research is to enhance project success through right project costing as well as project scheduling because both time and cost are important factors to become project successful. This study will enable project managers to handle their projects easy and better way which is not possible before this study.

Literature Review

Project management is defined through different dimensions in previous literature. According to International Competence Baseline (ICB) a project is the combination of different activities which have been completed and delivered on predefined time according to project schedules with in the predefined budget with proper project costing to achieve a specific organizational goals and objectives by fulfilling predefined organizational requirements as well as organizational standards (Riise, Mannino, & Burke, 2016). Project management is also a temporary contract between buyer and seller to create and sell products and services.

The uncertainty of project scheduling can be minimized by the implementation of computerized project scheduling tools (Maheswari et al., 2015). A lot of tools are available to proper project scheduling. The major project scheduling tools and techniques are program evaluation and review technique (PERT), critical path method (CPM). Different project tools and techniques are used in different projects (Van Peteghem & Vanhoucke, 2015). In some project linear project schedule method are used while at the same time multi story project tools and techniques are used. Purpose of all project scheduling tools are to accurately develop a schedule for project and remove the uncertainty (Maheswari et al., 2015).

Uncertainty of project scheduling is due to ignore the elements of projects at each stage. From initiate the project outcomes of the projects each level has its own elements which should be measure correctly to correctly measure project scheduling (Okubo et al., 2015). The uncertainties are interlinked with cost. Project is divided in different phases and at each phase different tasks are also associated with projects (Mejía et al., 2016).

Table 1: *Time and cost uncertainty modeling in project management*

Stage	Elements
Input	Activity duration uncertainty, Activity cost uncertainty, Resource availability
Process	Fuzzy Project Scheduling, Fuzzy cash flow analysis, Fuzzy resource leveling
Primary Output	Fuzzy project cost & completion time, Activity criticality Fuzzy project cash flow, Fuzzy resource usage profile
Secondary Output	Fuzzy Project benefits

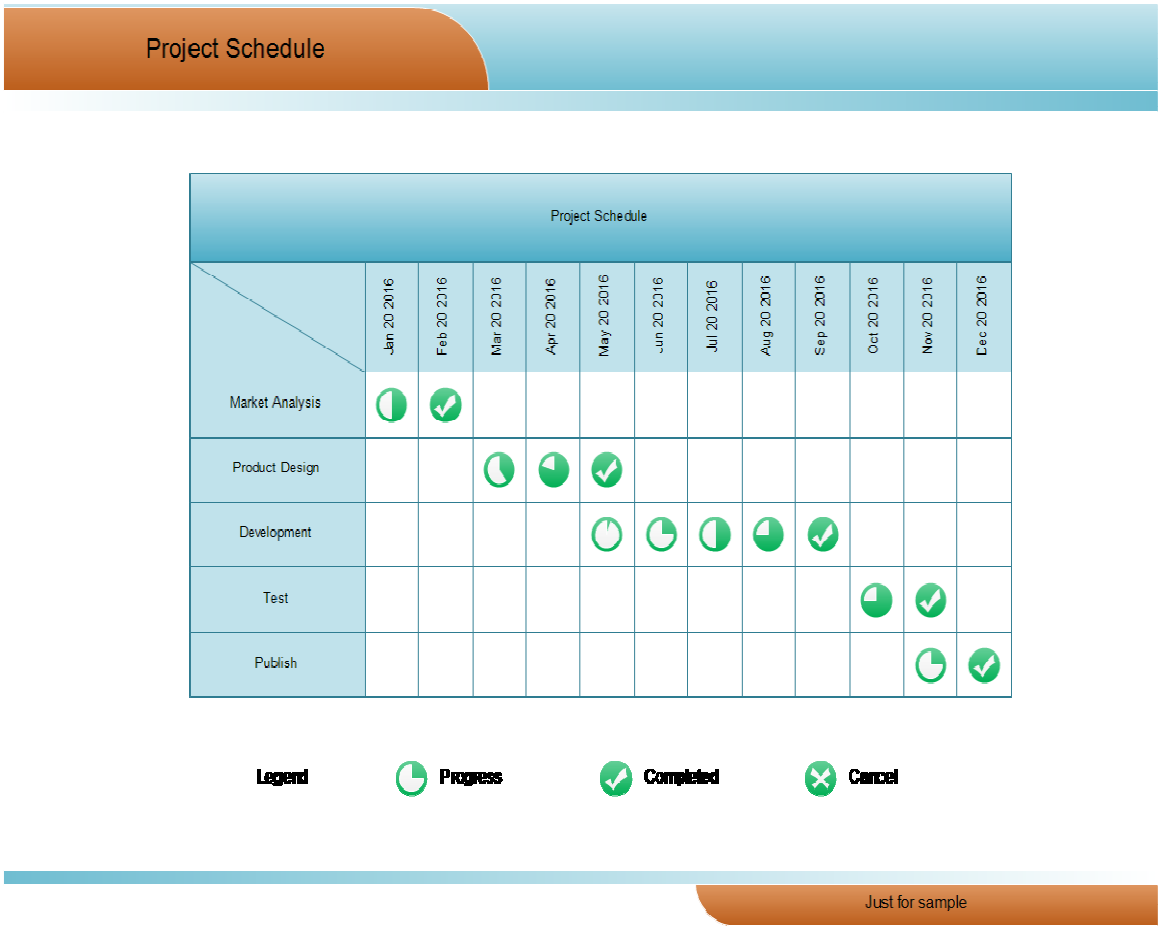
After the analysis of project schedule and the elements associated with each stage. The next step is to identify the modeling and classification for project scheduling. In the below table modeling theories associated with project schedule are mentioned. The below table is consists of table series which shows the nature of table which is associated with cross tabulation, pure logic series, time scaled series, chorno series, card series and chart series. Because project is scheduled according to the nature of table.

Table 2: *Modeling Theory Classification for Project Scheduling*

Table Series	Cross-Tabulation Series	Pure Logic Series	Time-Scaled Series	Chrono Series	Cad Series	Chart Series
TaskTable	Work-Task	ADM	Bar Charts	ChronoGraph	Sched/Cad2D	Column charts
RessTable	Work-Resources	PDM	Fenced BarChart	ChronoNetwork	4D CAD	Line charts
CostTable	Work-Area	PERT	PNA	ChronoBar	5D CAD	Pie charts
WokTable	Resource-Area	Decision-Box	PDM / ADM	ChronoTask	6D CAD	Bar charts
Follow Table	Date-Time	GERT	LOB / LSM	ChronoRess	7D CAD	Area charts
		VERT		ChronoWorkArea	8D CAD	XY (scatter) charts
		Simulation		ChronoLinear		Bubble charts
				ChronoCash		Radar charts

By applying relevant project scheduling technique. It is also required to make a project schedule sample in word for those project managers who have not availability of latest technology and those who are unaware about the latest or computerized technology. They should develop their project schedule according to the given below format which is simplest and easy to understand and facilitate project managers to accurately schedule their projects. The sample of project schedule will vary from project to project and activity to activity.

Table 3: *Sample Project Schedule*



On the other hand project costing is also most important in the success of every project. A sample project cost sources are given below to highlight some major project costs. After that project costing over time, actual vs project cost and project data sheet are given below to exactly project costing.

Source of Project Cost

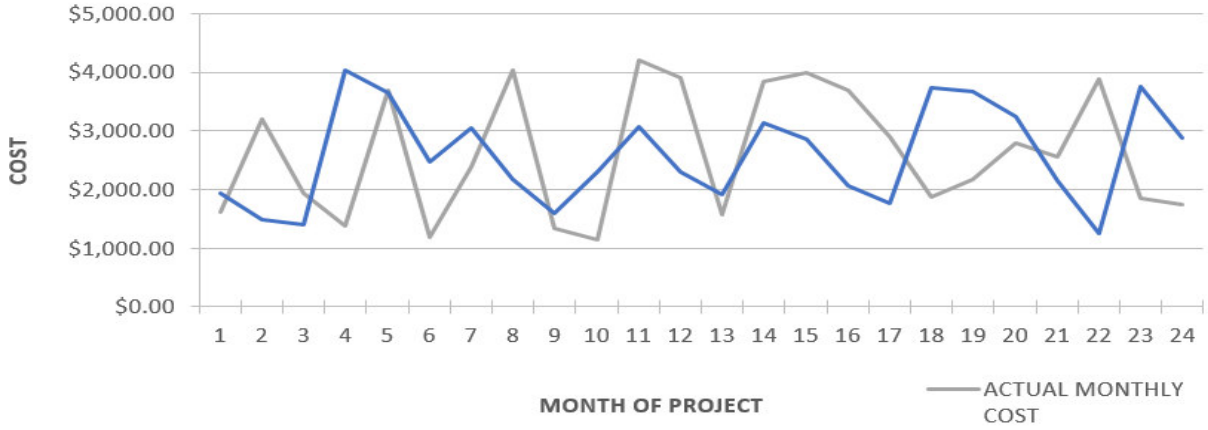
	PROJECT TASKS	LABOR HOURS	LABOR COST ($)	MATERIAL COST ($)	TRAVEL COST ($)	OTHER COST ($)	TOTAL PER TASK
PROJECT DESIGN	Develop Functional Specifications	1.0	$1.00	$1.00	$1.00	$1.00	$5.00
	Develop System Architecture	1.0	$1.00	$1.00	$1.00	$1.00	$5.00
	Develop Preliminary Design Specification	1.0	$1.00	$1.00	$1.00	$1.00	$5.00
	Develop Detailed Design Specifications	1.0	$1.00	$1.00	$1.00	$1.00	$5.00
	Develop Acceptance Test Plan	1.0	$1.00	$1.00	$1.00	$1.00	$5.00
	Subtotal	**5.0**	**$5.00**	**$5.00**	**$5.00**	**$5.00**	**$25.00**
PROJECT DEVELOPMENT	Develop Components	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Procure Software	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Procure Hardware	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Development Acceptance Test Package	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Perform Unit/Integration Test	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Subtotal	**0.0**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
PROJECT DELIVERY	Install System	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Train Customers	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Perform Acceptance Test	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Perform Post Project Review	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Provide Warranty Support	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Archive Materials	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Subtotal	**0.0**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
PROJECT MANAGEMENT	Customer Progress Meetings/Reports	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Internal Status Meetings/Reports	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Third-Party Vendor Interface	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Interface to Other Internal Departments	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Configuration Management	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Quality Assurance	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Overall Project Management	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Subtotal	**0.0**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
OTHER COST	Other cost	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Other cost	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Other cost	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	Subtotal	**0.0**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Subtotals		**5.0**	**$5.00**	**$5.00**	**$5.00**	**$5.00**	**$25.00**
Risk (Contingency)		0.0	$0.00	$0.00	$0.00	$0.00	**$0.00**
Total (Scheduled)		**5.0**	**$5.00**	**$5.00**	**$5.00**	**$5.00**	**$25.00**

Expenditure over Time

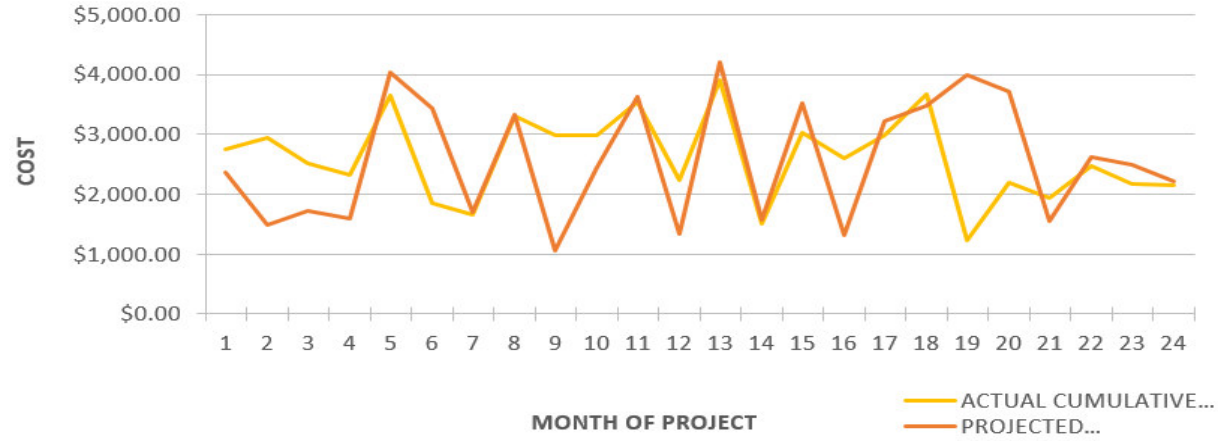
	ITEM	COST	DATE	REASON FOR EXPENDITURE
INSTALLATION	Install System	$0.00		
	Train Customers	$0.00		
	Perform Acceptance Test	$0.00		
	Perform Post Project Review	$0.00		
	Provide Warranty Support	$0.00		
	Achieve Materials	$0.00		
	Subtotal	**$0.00**		
PLANNING (RFP)	Install System	$0.00		
	Train Customers	$0.00		
	Perform Acceptance Test	$0.00		
	Perform Post Project Review	$0.00		
	Provide Warranty Support	$0.00		
	Achieve Materials	$0.00		
	Subtotal	**$0.00**		
PLANNING 2	Install System	$0.00		
	Train Customers	$0.00		
	Perform Acceptance Test	$0.00		
	Perform Post Project Review	$0.00		
	Provide Warranty Support	$0.00		
	Achieve Materials	$0.00		
	Subtotal	**$0.00**		
CONSTRUCTION	Install System	$0.00		
	Train Customers	$0.00		
	Perform Acceptance Test	$0.00		
	Perform Post Project Review	$0.00		
	Provide Warranty Support	$0.00		
	Achieve Materials	$0.00		
	Subtotal	**$0.00**		
TEST & DELIVERY	Install System	$0.00		
	Train Customers	$0.00		
	Perform Acceptance Test	$0.00		
	Perform Post Project Review	$0.00		
	Provide Warranty Support	$0.00		
	Achieve Materials	$0.00		
	Subtotal	**$0.00**		

Projected vs. Actual Costs

MONTHLY COST



CUMULATIVE COST



Project Data Worksheet

MONTH	PROJECTED MONTHLY COST	ACTUAL MONTHLY COST	PROJECTED CUMULATIVE COST	ACTUAL CUMULATIVE COST
1	$0	$0	$0	$0
2	$0	$0	$0	$0
3	$0	$0	$0	$0
4	$0	$0	$0	$0
5	$0	$0	$0	$0
6	$0	$0	$0	$0
7	$0	$0	$0	$0
8	$0	$0	$0	$0
9	$0	$0	$0	$0
10	$0	$0	$0	$0
11	$0	$0	$0	$0
12	$0	$0	$0	$0

Conclusion

This study is beneficial for project manager and academicians at the same time because this study highlight project scheduling and project costing at a same time to develop understanding the importance of project scheduling and costing for complex projects (Cheng et al., 2015). This will be more beneficial in the construction project or production projects. If the project is proper scheduled and cost effectively then the chance of projects will enhance which will leads to decrease the uncertainties in the projects at different stages.

Bibliography

Afshar-Nadjafi, B., Karimi, H., Rahimi, A., & Khalili, S. (2015). Project scheduling with limited resources using an efficient differential evolution algorithm. *Journal of King Saud University - Engineering Sciences, 27*(2), 176-184. doi: http://dx.doi.org/10.1016/j.jksues.2013.08.003

Bacate, M. L., Silvestre, M. A., Capili, D. S., Salaveria-Imperial, M. L., Tan, M. C., Reyes, K. A., . . . Co, P. A. (2015). PHP117 - Costing The National Health Insurance Program Prematurity Benefit Package: The Philippine Experience. *Value in Health, 18*(7), A534. doi: http://dx.doi.org/10.1016/j.jval.2015.09.1671

Beşikci, U., Bilge, Ü., & Ulusoy, G. (2015). Multi-mode resource constrained multi-project scheduling and resource portfolio problem. *European Journal of Operational Research, 240*(1), 22-31. doi: http://dx.doi.org/10.1016/j.ejor.2014.06.025

Braun, K. W. (2013). Custom fabric ventures: An instructional resource in job costing for the introductory managerial accounting course. *Journal of Accounting Education, 31*(4), 400-429. doi: http://dx.doi.org/10.1016/j.jaccedu.2013.07.004

Bukata, L., Šůcha, P., & Hanzálek, Z. (2015). Solving the Resource Constrained Project Scheduling Problem using the parallel Tabu Search designed for the CUDA platform. *Journal of Parallel and Distributed Computing, 77*, 58-68. doi: http://dx.doi.org/10.1016/j.jpdc.2014.11.005

Carli, G., & Canavari, M. (2013). Introducing Direct Costing and Activity based Costing in a Farm Management System: A Conceptual Model. *Procedia Technology, 8*, 397-405. doi: http://dx.doi.org/10.1016/j.protcy.2013.11.052

Cheng, J., Fowler, J., Kempf, K., & Mason, S. (2015). Multi-mode resource-constrained project scheduling problems with non-preemptive activity splitting. *Computers & Operations Research, 53*, 275-287. doi: http://dx.doi.org/10.1016/j.cor.2014.04.018

Esmalifalak, H., Albin, M. S., & Behzadpoor, M. (2015). A comparative study on the activity based costing systems: Traditional, fuzzy and Monte Carlo approaches. *Health Policy and Technology, 4*(1), 58-67. doi: http://dx.doi.org/10.1016/j.hlpt.2014.10.010

Francis, A. (2015). Graphical Modelling Classification for Construction Project Scheduling. *Procedia Engineering, 123*, 162-168. doi: http://dx.doi.org/10.1016/j.proeng.2015.10.073

Galle, W., Vandenbroucke, M., & De Temmerman, N. (2015). Life Cycle Costing as an Early Stage Feasibility Analysis: The Adaptable Transformation of Willy Van Der Meeren's Student Residences. *Procedia Economics and Finance, 21*, 14-22. doi: http://dx.doi.org/10.1016/S2212-5671(15)00145-8

Gillen, D., & Morrison, W. G. (2015). Aviation security: Costing, pricing, finance and performance. *Journal of Air Transport Management, 48*, 1-12. doi: http://dx.doi.org/10.1016/j.jairtraman.2014.12.005

Gutjahr, W. J. (2015). Bi-Objective Multi-Mode Project Scheduling Under Risk Aversion. *European Journal of Operational Research, 246*(2), 421-434. doi: http://dx.doi.org/10.1016/j.ejor.2015.05.004

Hosseininasab, S.-M., & Shetab-Boushehri, S.-N. (2015). Integration of selecting and scheduling urban road construction projects as a time-dependent discrete network design problem. *European Journal of Operational Research, 246*(3), 762-771. doi: http://dx.doi.org/10.1016/j.ejor.2015.05.039

Huang, X., & Zhao, T. (2014). Project selection and scheduling with uncertain net income and investment cost. *Applied Mathematics and Computation, 247*, 61-71. doi: http://dx.doi.org/10.1016/j.amc.2014.08.082

Jędrzejowicz, P., & Ratajczak-Ropel, E. (2014). Reinforcement Learning strategies for A-Team solving the Resource-Constrained Project Scheduling Problem. *Neurocomputing, 146*, 301-307. doi: http://dx.doi.org/10.1016/j.neucom.2014.05.070

Kádárová, J., Teplická, K., Durkáčová, M., & Vida, M. (2015). Target Costing Calculation and Economic Gain for Companies. *Procedia Economics and Finance, 23*, 1195-1200. doi: http://dx.doi.org/10.1016/S2212-5671(15)00331-7

Kellenbrink, C., & Helber, S. (2015). Scheduling resource-constrained projects with a flexible project structure. *European Journal of Operational Research, 246*(2), 379-391. doi: http://dx.doi.org/10.1016/j.ejor.2015.05.003

Koyuncu, E., & Erol, R. (2015). PSO based approach for scheduling NPD projects including overlapping process. *Computers & Industrial Engineering, 85*, 316-327. doi: http://dx.doi.org/10.1016/j.cie.2015.04.004

Kulworawanichpong, T., & Mwambeleko, J. J. (2015). Design and costing of a stand-alone solar photovoltaic system for a Tanzanian rural household. *Sustainable Energy Technologies and Assessments, 12*, 53-59. doi: http://dx.doi.org/10.1016/j.seta.2015.10.001

Li, H., & Womer, N. K. (2015). Solving stochastic resource-constrained project scheduling problems by closed-loop approximate dynamic programming. *European Journal of Operational Research, 246*(1), 20-33. doi: http://dx.doi.org/10.1016/j.ejor.2015.04.015

Maheswari, J. U., Charlesraj, V. P. C., Goyal, A., & Mujumdar, P. (2015). Application of Relationship Diagramming Method (RDM) for Resource-constrained Scheduling of Linear Construction Projects.

Procedia Engineering, 123, 308-315. doi: http://dx.doi.org/10.1016/j.proeng.2015.10.095

McLean, T. (2013). Cost engineering and costing in Hawthorn Leslie Shipbuilders, 1886–1915. *The British Accounting Review, 45*(4), 284-296. doi: http://dx.doi.org/10.1016/j.bar.2013.06.010

Mejía, G., Niño, K., Montoya, C., Sánchez, M. A., Palacios, J., & Amodeo, L. (2016). A Petri Net-based framework for realistic project management and scheduling: An application in animation and videogames. *Computers & Operations Research, 66*, 190-198. doi: http://dx.doi.org/10.1016/j.cor.2015.08.011

Moore, T., & Morrissey, J. (2014). Lifecycle costing sensitivities for zero energy housing in Melbourne, Australia. *Energy and Buildings, 79*, 1-11. doi: http://dx.doi.org/10.1016/j.enbuild.2014.04.050

Moukrim, A., Quilliot, A., & Toussaint, H. (2015). An effective branch-and-price algorithm for the Preemptive Resource Constrained Project Scheduling Problem based on minimal Interval Order Enumeration. *European Journal of Operational Research, 244*(2), 360-368. doi: http://dx.doi.org/10.1016/j.ejor.2014.12.037

Okubo, H., Miyamoto, T., Yoshida, S., Mori, K., Kitamura, S., & Izui, Y. (2015). Project scheduling under partially renewable resources and resource consumption during setup operations. *Computers & Industrial Engineering, 83*, 91-99. doi: http://dx.doi.org/10.1016/j.cie.2015.02.006

Porter, S. (2015). 13 - Planning your MOOC—costings. In S. Porter (Ed.), *To MOOC or Not to MOOC* (pp. 79-88): Chandos Publishing.

Riise, A., Mannino, C., & Burke, E. K. (2016). Modelling and solving generalised operational surgery scheduling problems. *Computers & Operations Research, 66*, 1-11. doi: http://dx.doi.org/10.1016/j.cor.2015.07.003

Ristimäki, M., Säynäjoki, A., Heinonen, J., & Junnila, S. (2013). Combining life cycle costing and life cycle assessment for an analysis of a new residential district energy system design. *Energy, 63*, 168-179. doi: http://dx.doi.org/10.1016/j.energy.2013.10.030

Rohaninejad, M., Tavakkoli-Moghaddam, R., & Vahedi-Nouri, B. (2015). Redundancy Resource Allocation for Reliable Project Scheduling: A Game-theoretical Approach. *Procedia Computer Science, 64*, 265-273. doi: http://dx.doi.org/10.1016/j.procs.2015.08.489

Settanni, E., Newnes, L. B., Thenent, N. E., Parry, G., & Goh, Y. M. (2014). A through-life costing methodology for use in product–service-systems. *International Journal of Production Economics, 153*, 161-177. doi: http://dx.doi.org/10.1016/j.ijpe.2014.02.016

Shahsavar, A., Najafi, A. A., & Niaki, S. T. A. (2015). Three self-adaptive multi-objective evolutionary algorithms for a triple-objective project scheduling problem. *Computers & Industrial Engineering, 87*, 4-15. doi: http://dx.doi.org/10.1016/j.cie.2015.04.027

Shou, Y., Li, Y., & Lai, C. (2015). Hybrid particle swarm optimization for preemptive resource-constrained project scheduling. *Neurocomputing, 148*, 122-128. doi: http://dx.doi.org/10.1016/j.neucom.2012.07.059

Strazza, C., Del Borghi, A., Costamagna, P., Gallo, M., Brignole, E., & Girdinio, P. (2015). Life Cycle Assessment and Life Cycle Costing of a SOFC system for distributed power generation. *Energy Conversion and Management, 100*, 64-77. doi: http://dx.doi.org/10.1016/j.enconman.2015.04.068

Swift, K. G., & Booker, J. D. (2013). Chapter 12 - Component Costing. In K. G. S. D. Booker (Ed.), *Manufacturing Process Selection Handbook* (pp. 351-391). Oxford: Butterworth-Heinemann.

Thibodeau, C., Monette, F., & Glaus, M. (2014). Comparison of development scenarios of a black water source-separation sanitation system using life cycle assessment and environmental life cycle costing. *Resources, Conservation and Recycling, 92*, 38-54. doi: http://dx.doi.org/10.1016/j.resconrec.2014.08.004

Tofighian, A. A., & Naderi, B. (2015). Modeling and solving the project selection and scheduling. *Computers & Industrial Engineering, 83*, 30-38. doi: http://dx.doi.org/10.1016/j.cie.2015.01.012

Tsai, W.-H., Yang, C.-H., Chang, J.-C., & Lee, H.-L. (2014). An Activity-Based Costing decision model for life cycle assessment in green building projects. *European Journal of Operational Research, 238*(2), 607-619. doi: http://dx.doi.org/10.1016/j.ejor.2014.03.024

Turner, J. R., Huemann, M., Anbari, F., & Bredillet, C. (2010). *Perspectives on Projects*. Oxon: Routledge.

Van Peteghem, V., & Vanhoucke, M. (2015). Influence of learning in resource-constrained project scheduling. *Computers & Industrial Engineering, 87*, 569-579. doi: http://dx.doi.org/10.1016/j.cie.2015.06.007

Zhang, L.-h., & Zou, X. (2015). Chapter 6 - Resource-Constrained Scheduling in Repetitive Construction Projects. In L.-h. Z. Zou (Ed.), *Repetitive Project Scheduling: Theory and Methods* (pp. 71-85). Oxford: Elsevier.

Zheng, X.-l., & Wang, L. (2015). A multi-agent optimization algorithm for resource constrained project scheduling problem. *Expert Systems with Applications, 42*(15–16), 6039-6049. doi: http://dx.doi.org/10.1016/j.eswa.2015.04.009