Early Warning System for a Project Monitoring and Control

Keynote presentation

Prof. Dr. Sc. Mladen Radujković,
Director of International Doctoral Study in Project Management at Alma Mater Europea ECM University

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Croatian Water Government Agency
About the lead author

- Director of International Doctoral Study in Project Management at Alma Mater Europea University ECM, Slovenia (2015.-2017.)
- Former Professor of Project Management and Construction Management at the University of Zagreb Faculty of Civil Engineering, Croatia (1995. -2017.) Former Vice dean and Dean at the University of Zagreb
- President of Council of Delegates (IPMA CoD Chair) at International Project Management Association, IPMA, and also Former IPMA President (2013-2014) and Vice President in three terms (2007-2012)
- President of Croatian Association for Project Management.
- Consultant for Projects, programs and portfolios in the South-east Europe (Booz Allen; USAID; Strabag; Importanne; Ilbau; Adris;...)
- Published about 200 papers and presenter at more then 50 international events, participation in around 20 research projects, around 35 keynotes at international events, ...
- Around 35 years of experience working like site manager, supervisor, project manager, consultant for different projects including research, water, transport, education, tourism, ...
- Director at Project, Program and Portfolio Expert, Croatia, European Union
Alma Mater Europea ECM University: Director of Doctoral Study in Project Management

- **Study Duration:** 6 semesters / 3 years
- **Level of Study:** II Bologna cycle
- **Credit Points:** 180 ECTS
- **Study Approach:** Blended program tailored for candidates who are employed
- **Obtained Title:** Doctor of science in Project Management
- **Location of Studies:** Slovenia, Austria, Croatia
- **Staff:** International staff from different countries including USA, UK, Germany, Austria, Italy, Spain, Slovenia, Croatia, Romania
- **Start of the Program:** October
- **Study Accreditation:** Accredited study in Slovenia,

1. **Year – 6 courses with exams, (3 compulsory and 3 electives); 2 seminars on specific topics within the project program and portfolio management**

2. **Year – doctoral dissertation research; 2 PM workshops with compulsory attendance; case study research; PM conference participation; paper (presentation and publishing) at a PM conference**

3. **Year – doctoral dissertation research; PM paper in a journal in any data base; company visit and presentation of research results at an industrial partner (company, organization); paper published in a PM (listed journal).**

AME ECM University Under the patronage of the European Academy of Sciences and Arts Salzburg (EASA) (over 1,900 scientists and 33 Nobel Prize winners)

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Prof. dr. Mladen Radujkovic and dr. Mariela Sjekavica, Croatia, EU
About the co-author

Dr.sc. Mariela Sjekavica (CROATIA)

- Specialist for Project Management System Development at Croatian Water Government Agency (Sector for EU co-financed Projects)
- Former Teaching Assistant of Construction Management at the University of Zagreb Faculty of Civil Engineering, Croatia
- Member of Croatian Association for Project Management and IPMA Young Crew Croatia
- Certified project manager and public procurement specialist
- Researcher on project management topics
- PhD topic „Early warning system in managing construction projects”, 2017.
Our World = The Project World

- 97% organizations believe that project management is a critical activity for business success and organizational success (PWC, 2012)
- Project manager is a job of 21st century (The Fortune Magazine, 1999)
Why projects?

- In a dynamic human environment project is a tool for converting an opportunity to a benefit.
Projectification in Europe

• The extent of **projectification in Norway** was **32,6%** in 2014.
• The extent of **projectification in Iceland** was **27,7%** in 2014.
• The extent of **projectification in Germany** was **34,7%** in 2013 –measured in the overall working time.

• Assumption: this corresponds to a gross domestic product in Germany of 877 bln. € that was created by the organisational form of projects.
• The share of projectification increased from **2009 to 2013 by 18,4%**.
• For 2019 a further increase to **41,3%** is forecasted however with a slower growth rate.

• Source: Macroeconomic measurement of the German project economy Meet the Experts -International Project Management Conference Lisboa, Prof. Dr. Yvonne Schoper, University of Applied Sciences Berlin
Problem: Poor project performance over decades

- There are too many reports about poor project performance:
  - UK Office of Government Commerce Report,
  - ............
  - Standard & Poor’s, Global PM Survey, 2012
  - Gartner Survey, June 2012
  - .............

Too many projects fail to deliver against their budget, schedule, scope, quality and benefits baseline

In period 2004–2014:
- On average 35% projects successful, 20% failed, 45% challenged

There is a permanent need for improving the success score for delivering benefits
**Example - Megaprojects: Global Top Cost Overruns....**

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost Overrun (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suez Canal, Egypt</td>
<td>1,900</td>
</tr>
<tr>
<td>Scottish Parliament Building, Scotland</td>
<td>1,600</td>
</tr>
<tr>
<td>Sydney Opera House, Australia</td>
<td>1,400</td>
</tr>
<tr>
<td>Montreal Summer Olympics, Canada</td>
<td>1,300</td>
</tr>
<tr>
<td>Concorde Supersonic Aeroplane</td>
<td>1,100</td>
</tr>
<tr>
<td>Troy and Greenfield Railroad, USA</td>
<td>600</td>
</tr>
<tr>
<td>Excalibur Smart Projectile, USA, Sweden</td>
<td>650</td>
</tr>
<tr>
<td>Canadian Firearms Registry, Canada</td>
<td>590</td>
</tr>
<tr>
<td>Lake Placid Winter Olympics, USA</td>
<td>560</td>
</tr>
<tr>
<td>Medicare transaction system, USA</td>
<td>560</td>
</tr>
<tr>
<td>Bank of Norway headquarters, Norway</td>
<td>440</td>
</tr>
<tr>
<td>Furka Base Tunnel, Switzerland</td>
<td>300</td>
</tr>
<tr>
<td>Verrazano Narrow Bridge, USA</td>
<td>280</td>
</tr>
<tr>
<td>Boston’s Big Dig Artery/Tunnel project, USA</td>
<td>220</td>
</tr>
<tr>
<td>Denver International Airport, USA</td>
<td>200</td>
</tr>
<tr>
<td>Panama Canal, Panama</td>
<td>200</td>
</tr>
<tr>
<td>Minneapolis Hiawatha light rail line, USA</td>
<td>190</td>
</tr>
<tr>
<td>Humber Bridge, UK</td>
<td>180</td>
</tr>
<tr>
<td>Dublin Port Tunnel, Ireland</td>
<td>160</td>
</tr>
<tr>
<td>Montreal Metro Laval extension, Canada</td>
<td>160</td>
</tr>
<tr>
<td>Copenhagen Metro, Denmark</td>
<td>150</td>
</tr>
<tr>
<td>Boston–New York–Washington Railway, USA</td>
<td>130</td>
</tr>
<tr>
<td>Great Belt Rail Tunnel, Denmark</td>
<td>120</td>
</tr>
<tr>
<td>London Limehouse Road Tunnel, UK</td>
<td>110</td>
</tr>
<tr>
<td>Brooklyn Bridge, USA</td>
<td>100</td>
</tr>
<tr>
<td>Shinkansen Joetsu high-speed rail line, Japan</td>
<td>100</td>
</tr>
<tr>
<td>Channel Tunnel, UK, France</td>
<td>80</td>
</tr>
<tr>
<td>Karlsruhe–Bretten light rail, Germany</td>
<td>80</td>
</tr>
<tr>
<td>London Jubilee Line extension, UK</td>
<td>80</td>
</tr>
<tr>
<td>Bangkok Metro, Thailand</td>
<td>70</td>
</tr>
<tr>
<td>Mexico City Metroline, Mexico</td>
<td>60</td>
</tr>
<tr>
<td>High-speed Rail Line South, The Netherlands</td>
<td>60</td>
</tr>
<tr>
<td>Great Belt East Bridge, Denmark</td>
<td>50</td>
</tr>
</tbody>
</table>

*Bent Flyvbjerg, Said Business School, Oxford University, Oxford, United Kingdom*

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## Project success and Project management success

Source: Research paper - Radujkovic M., Sjekavica M., *GRAĐEVINAR* 69 (2017) 2, 105-120

<table>
<thead>
<tr>
<th>Project management success</th>
<th>Project success</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus: Short-term and specific organisational goals</strong></td>
<td><strong>Focus: Long-term goals and project owner’s organisational needs</strong></td>
</tr>
<tr>
<td><strong>Successful project delivery – ready for use</strong></td>
<td><strong>Successful business case – benefit for project owner</strong></td>
</tr>
<tr>
<td><strong>Internal focus on the way the project is managed</strong></td>
<td><strong>Focus on the project’s effects on the organisation, i.e. on the community being the owner of the project</strong></td>
</tr>
<tr>
<td><strong>Evaluation through traditional performance criteria, e.g. time, cost and quality</strong></td>
<td><strong>Evaluation through all-comprising criteria and final outcome of the project – benefit during service life of the project</strong></td>
</tr>
<tr>
<td><strong>Efficiency is an internal and short-term dimension during preparation and implementation of the project</strong></td>
<td><strong>Efficiency and effectiveness, internal and external, long-term and short-term dimensions, during all phases and especially through the service life of the project.</strong></td>
</tr>
<tr>
<td><strong>Three dimensions: time, costs, quality and short-term perspective</strong></td>
<td><strong>Fourth dimension: project benefits and long-term perspective</strong></td>
</tr>
</tbody>
</table>

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*Prof. dr. Mladen Radujkovic and dr. Mariela Sjekavica, Croatia, EU*
Each project is unique and has own composition of success factors. However, timely disposition of relevant project information is always part of the set.
The monitoring & control cycle

PROJECT MANAGEMENT

EARLY WARNING SYSTEM

SPEEDING UP

CONTROLLING

PROJECT

THE PROJECT PLAN

PROJECT IMPLEMENTATION: RISKS, CHANGES AND CONSTRAINTS

Prof. dr. Mladen Radujkovic and dr. Mariela Sjekavica, Croatia, EU
Example : Time monitoring & control

1. Which cycle do you usually practice: 1, 2, 3,......, or „n“?
2. What type of information you use for project management: past, present or future, or maybe all of them?
The value of information .... and EWS

• Early Warning System (EWS) is based on simple assumption that sooner the information is gathered the more valuable it is.

EWS provide three dimensions

PAST
Learn

PRESENT
Act and learn

FUTURE
Optimise, act and learn
From the theory: What is Early Warning?

• **EARLY WARNING SYSTEM** = any initiative that focuses on systematic information gathering, analysis and/or formulation of recommendations, including risk assessment and information sharing, independently of topic, and if its quantitative, qualitative or combination of both (Austin, 2004).

• Igor Ansoff (1975; 1984) – *Theory of ”weak and strong signals”: ” strategic surprises” in business are not arising from nowhere*

• **EARLY WARNING** = any thing, information, sign that can influence unfavorably on total success (Nikander, 2002; Ansoff, 1984; Kussi, 1999 according to Nikander, 2002; Austin, 2004; Kappelman et al., 2007)
From the research: Early Warning in Projects

• Exceptionally little project management literature is dealing with early warning explicitly (Nikander, 2002), especially in construction (Navon and Kolton, 2006)

• The effectiveness of project control – early forecast and project manager decisions (Kim, 2007) – before unsuccessful project outcome (Haji-Kazemi et al., 2013)

• The need of project manager to predict future on more effective way, t.i. to have more proactive tools (Nikander, 2002; Spjelkavik et al., 2008)

• Help in making right decisions (Haji-Kazemi et al., 2013)

• Increasing the probability of project success (Kappelman et al., 2007; Vanhoucke, 2012)

• The need for EWS, so as the potential of EWS
Possible Early Warning Signs in Projects

• Change in peoples’ attitude (Cleland, 1994; Kerzner, 2013)
• Low morale of project team (Kleim and Ludin, 1994)
• Communication delays, constant negativity, „we” and „they” mentality, lack of will to share information or ideas, lack of interest in project, questioning everything, acting like obvious things are unclear (De Mascia, 2015)
• Continuous delays, poor quality of schedule, inexplicable changes in work division, lack of work force, increase in contractor search for explanations from designer as a base for initial budget increase approval, changes in project management, litigations with subcontractors (Conley, 2015)
• Problems in procurement phase (Zeitoun and Oberlender, 1993 according to Nikander, 2002)
• Early warning signs: in project initiation, in early phases and during construction (Harrin, 2011)
• Early warning signs: in procurement phase, in contract initiation phase, during construction (Navigant Construction Forum™, 2015)
## Tools & Models that contain EW Philosophy

<table>
<thead>
<tr>
<th>AUTHOR, YEAR</th>
<th>MODEL/TOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinto and Slevin, 1992</td>
<td>Project Implementation Profile</td>
</tr>
<tr>
<td>Williams et al., 2012</td>
<td>Project Assessment Methods</td>
</tr>
<tr>
<td>Lowe, 2016</td>
<td>Maturity models, DICE (Boston Consulting Group), Stakeholder analysis, Simple questions and surveys, Retrospective and lessons learned</td>
</tr>
<tr>
<td>Spjelkavik et al., 2008</td>
<td>Project „health check“ tool</td>
</tr>
<tr>
<td>Mavrotas et al., 2005</td>
<td>S curves</td>
</tr>
<tr>
<td>Fleming and Koppelman, 1998</td>
<td>CAP – Control costs plan</td>
</tr>
<tr>
<td>Azeem et al., 2014</td>
<td>Deterministic models of time forecast on construction projects: EV (Earned Value); ES (Earned Schedule)</td>
</tr>
<tr>
<td>Vondruška, 2014</td>
<td>EWS in detection crisis on construction projects</td>
</tr>
<tr>
<td>Wang et al., 2009</td>
<td>EWS linked with safety during construction of mountain highways</td>
</tr>
<tr>
<td>Yang and Wang, 2010</td>
<td>EWS linked with construction safety risks</td>
</tr>
</tbody>
</table>
From the practice: PM and EWS - Paradox!

• EWS in military, economy, IT industry, medicine, crisis and security management, communicology, ethno politics...

• Although of wide and proven usage within many sectors of economy and human activities, EWS have been out of main focus of PM theory and praxes (Nikander, 2002; Haji-Kazemi, 2013; Haji-Kazemi et al., 2015)

• PM is not using the potential of EWS, and consequently not leveraging from its potential, which particularly goes for managing project risks, changes and constraints (Radujković, 2014).

• EWs should be built in heart of nearly every PM attempt!
Project Management and EWS

It is all about the time! Those who are mastering the time, are able to achieve much more then other

Prof. dr. Mladen Radujkovic and dr. Mariela Sjekavica, Croatia, EU
Possible Early Warning Signs Categories

• **EWS linked with**: business case sustainability, time, scope, quality, cost, project participants and communication (Lowe, 2016)

• **EWS linked with**: gut feelings, project team, project manager, planning, control, project work, communication, project participants, documents and reporting, differences and shortcomings in project culture, external sources etc. (Nikander, 2002)

• **In our EWS we decided to link EWS to the three main group of factors, each composed by sub-factors. They are related to:**
  • State of risks, changes and constraints
  • Competences of key personal
  • Adequate us of PM
Our model of Project Management and EWS


1. DETECTION
   • Which EWS are present at project?

2. VALIDATION
   • How strong are present EWS?

3. EARLY RESPONSE
   • How can we answer on these EWS?

The model is composed by three phases and three main group of factors – for creating early response.
Conclusions and suggestions for the future steps in development of EWS in Project Management

• The use of EWS in PM is still not at proper level
• PM needs solutions that put EWS in focus, because it can contribute in decreasing the failure scenarios
• EWS supports PM in making proper and timely decisions, before escalation of potential problems
• While creating EWS, one should consider qualitative and quantitative aspects, and practice simple solutions,
Thank you. Please send your questions to:

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