

	Case Name: Christmas market	Sector	Event management	
	OR-AS Operations Research - Applications and Solutions www.or-as.be info@or-as.be	Baseline schedule	Schedule with resources	
			Schedule with costs	
		Risk analysis	Random Simulation	
Submitted by	Mayté & Thymo		One of nine std. scenarios	
Date	2018		User defined distributions	
File Name	C2018-13 Christmas market	Project Control	Automatic tracking	
			Tracking based on user input	

1. Project description

Project Authenticity

The project consists of *activity, resource and cost* data that were obtained directly from the actual project owner.

2. Project properties

2.1. Baseline schedule

General	
# Activities	31
Planned Duration (PD)	132 days*
Budget at Completion (BAC)	€ 58.900,00
Renewable Resources	2
Consumable Resources	-

Network Topology	
Serial/Parallel (SP)	56%
Activity Distribution (AD)	72%
Length of Arcs (LA)	25%
Topological Float (TF)	12%

* Standard eight-hour working days

2.2. Risk analysis

Random simulation by ProTrack was performed using the default symmetric triangular risk distribution profiles.

	Cost sensitivity		
	avg (%)	std dev (%)	skew (-)
CRI-r	9,26	16,24	1,9
CRI-rho	36,42	19,09	-0,9
CRI-thau	62,74	40,54	-0,2

	Resource sensitivity		
	avg (%)	std dev (%)	skew (-)
CRI-r	50,00	50,00	N/A
CRI-rho	75,00	25,00	N/A
CRI-thau	99,50	0,50	N/A

	Time sensitivity		
	avg (%)	std dev (%)	skew (-)
CI	30,0	45,8	0,9
SI	38,7	39,3	0,8
SSI	5,8	16,1	2,8
CRI-r	12,0	17,2	2,3
CRI-rho	18,1	19,2	1,3
CRI-thau	30,3	27,0	1,6

2.3. project Control

2.3.1. Simulated forecasting accuracy

The accuracy of time and cost forecasting methods has been evaluated based on Monte Carlo simulation runs using the risk profiles described in section “2.2. Risk Analysis”. Based on these risk profiles, the Mean Absolute Percentage Error (MAPE) and Mean Percentage Error (MPE) has been calculated to evaluate the expected accuracy of the time and cost predictions, EAC(t) and EAC, respectively.

simulated EAC (t) accuracy		
Method - PF	MAPE (%)	MPE (%)
PV - 1	17,29%	16,81%
PV - SPI	16,65%	6,81%
PV - SCI	31,46%	-29,40%
ED - 1	6,31%	2,49%
ED - SPI	11,76%	-8,14%
ED - SCI	21,49%	-20,14%
ES- 1	6,73%	6,48%
ES- SPI(t)	5,32%	-2,63%
ES - SCI(t)	12,62%	-12,46%

simulated EAC accuracy		
Method - PF	MAPE (%)	MPE (%)
1	9,01%	9,01%
CPI	5,06%	1,06%
SPI	6,44%	-1,75%
SPI (t)	6,08%	-2,57%
SCI	14,21%	-13,82%
SCI (t)	15,13%	-15,02%
0.8 CPI + 0.2 SPI	5,12%	1,06%
0.8 CPI + 0.2 SPI (t)	5,06%	0,46%

According to the MAPE values the best performance for time forecasting can be expected from the unweighed earned duration method. For cost forecasting the CPI-weighted method should yield the best results.

2.3.2 Tracking description

Tracking Authenticity

Manual tracking was performed over 37 tracking periods with regular lengths of approximately one week. The Real Duration and Real Cost mentioned in section “2.3.3. Earned Value Management” are based on manual user input.

The tracking information obtained from the project owner and introduced in ProTrack includes actual activity start dates, durations, and costs.

2.3.3. Earned Value Management

2.3.3.1. Performance metrics

	CV (€)	SV (€)	SV(t) (d)	CPI(-)	SPI (-)	SPI(t) (-)	p-factor (-)
avg	-11520,72	-9559,10	-198,59	0,69	0,74	0,78	0,99
std dev	7211,05	7527,81	137,73	0,02	0,20	0,11	0,02
final	-25020,00	0,00	-426,00	0,70	1,00	0,71	1,00

2.3.3.2. Time forecasting

PD	132 days	Real duration	185 days	Late	40,34%
----	----------	---------------	----------	------	--------

EAC (t)	Real Accuracy			
Method - PF	avg (d)	std dev (d)	MAPE (%)	MPE (%)
PV - 1	109,81	12,04	81,4	-81,4
PV - SPI	144,95	73,26	75,4	-75,4
PV - SCI	209,65	105,99	64,7	-64,5
ED - 1	117,49	15,61	80,1	-80,1
ED - SPI	151,84	71,03	74,3	-74,3
ED - SCI	189,95	105,60	67,9	-67,8
ES - 1	112,22	12,35	81,0	-81,0
ES - SPI(t)	123,57	14,46	79,1	-79,1
ES - SCI(t)	148,84	18,64	74,8	-74,8

2.3.3.3 Cost forecasting

BAC (€)	€ 58.900,00	Real cost	€ 83.920,00	Over Budget	42,47%
---------	-------------	-----------	-------------	-------------	--------

EAC	Real Accuracy			
Method - PF	avg (€)	std dev (€)	MAPE (%)	MPE (%)
1	70420,72	7211,05	20,4	-20,4
CPI	85317,84	2175,03	2,1	1,6
SPI	92416,47	40386,22	14,5	-0,1
SPI (t)	78849,31	8527,62	8,6	-7,9
SCI	117282,98	62158,23	18,8	18,8
SCI (t)	97632,52	11185,53	13,0	13,0
0.8 CPI + 0.2 SPI	85107,86	4638,09	3,7	1,1
0.8 CPI + 0.2 SPI (t)	83698,20	2822,31	2,6	-0,4