Elements of Manufacturing Management

04/05/2023

The basics of Management

What is the essence of management? The ABC, I mean. **Plan, Budget and Forecast.**

We know what's a plan.

What is a Budget? **What is the difference between Budget and Forecast**?

Let's start from the Forecast which is simpler. A prediction. As exact as possible. For example, the forecast of the weather.

There is an interesting Danish proverb that says: "There is no bad weather but inappropriate clothes". This resembles the Budget. To make a plan of suitable clothes.

So, making a budget means considering all the measures we can put in place to improve the result in front of a forecast.

Management control

What does it mean that a project or a system are under control?

Mathematicians would say: "Taking a small epsilon at will, there is a delta interval such that within this range the parameters of the project deviate from the budget less than epsilon".

In simple words**, the deviation never takes on unexpected values** but only small variations, small enough to allow us to correct the strategy before suffering worse consequences.

What does it mean that a project or a system are managed? That all parameters are under control.

Ultimately, the essence of Management is to make a budget and keep it under control through periodic checkpoints with the deviation analysis and the definition of corrective actions.

Example of a simple Plant Budget

		jan	feb	mar	apr	mag	giu	lug	ago	set	ott	nov	dic	year
Volumes (ku)		11	11	11	11	11	11	11	3	11	11	11	7	**120**
	pku													
Variable cost	70	770	770	770	770	770	770	770	210	770	770	770	490	**8400**
Fixed cost	30	330	330	330	330	330	330	330	90	330	330	330	210	**3600**
Total		1100	1100	1100	1100	1100	1100	1100	300	1100	1100	1100	700	**12000**

Example of a Budget review

- At the end of March, we compare Actuals with Forecast

Calculated as
exp var= bdg var * (new vol/old vol)
exp fix = bdg fix

		jan	feb	mar	forecast	actual	expected	delta	delta%
volumes		11	11	11	33	25			
variable	70	770	770	770	2310	2100	1750	350	15%
fixed	30	330	330	330	990	1100	990	110	11%
Total		1100	1100	1100	3300	3200	2740	460	14%

Example of a Forecast 3+9

- At the end of March, we compare Actuals with Forecast

		actual													delta
			apr	mag	giu	lug	ago	set	ott	nov	dic	**F3+9**	**Budget**	delta	%
volumes		25	10	11	11	11	3	13	15	15	10	**112**	**120**	-8	-7%
												-8			
variable	70	2100	770	770	770	770	210	770	770	770	490	**8190**	**8400**	-210	-3%
fixed	30	1100	330	330	330	330	90	330	330	330	210	**3710**	**3600**	110	3%
Total		3200	1100	1100	1100	1100	300	1100	1100	1100	700	**11900**	**12000**	-100	-1%
Revenues	110											**-880**			
												11020	**12000**	-980	-8%
Company revenues	1000											-8000			

Adjustment

		actual	apr	mag	giu	lug	ago	set	ott	nov	dic	F3+9	Budget	delta	delta %
volumes		25	**10**	**11**	**11**	**11**	**3**	**13**	**13**	**13**	**10**	**120**	**120**	0	0%
variable	67	2100	**670**	**737**	**737**	**737**	**201**	**871**	**871**	**871**	**670**	**8465**	**8400**	65	1%
fixed	27	1100	**270**	**297**	**297**	**297**	**81**	**351**	**351**	**351**	**270**	**3665**	**3600**	80	2%
Total		3200	940	1034	1034	1034	282	1222	1222	1222	940	**12130**	**12000**	-200	1%

Sensitivity analysis

The sensitivity analysis is a mathematical evaluation of the influence that all possible parameters gives to a result e.g. a Business case or a Budget.

If we consider it as a function of many variables F(x1,x2,x3,…xN) the sensitivity analysis is the identification of:

$$\frac{\partial F}{\partial x1}, \frac{\partial F}{\partial x2}, \frac{\partial F}{\partial x3} \ldots \frac{\partial F}{\partial xN}$$