PRODUCT QUALITY ESTIMATE

In new version of GMC-simulator appeared important innovation in management reports - sheet "W", which stores raw data for formation of the remaining sheets (useful in computational models development). However, if you parse each row in sheet "W", then you will see, that part of rows remains unused data in lines - 102, 103, 104, 105, 106, 107. For example:

1．172

2．164

3．140

4．5.65

5．5.25

6．4.04

Easy to guess that this is customer’s quality estimate of your product. Previously, if you want to find out quality estimate, you must buy marketing information. But now, you only need to turn the sheet. Moreover, in the initial data estimate expressed not in stars (\*), but numerically. That allows to find mechanism of quality estimate formation by comparing different management reports together.

Product quality estimate consists of three components:

1．Research and Development (R&D)

2．Product assembly time

3．High quality raw materials

**Research and Development**

Table contains quality estimates for 10 periods (including 5 periods of history).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Period | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Product estimate 1 | 96 | 96 | 96 | 96 | 96 | 96 | 134 | 133 | 132 | 131 |
| Product estimate 2 | 96 | 91 | 92 | 93 | 94 | 133 | 151 | 149 | 147 | 164 |
| Product estimate 3 | 153 | 151 | 149 | 166 | 163 | 160 | 176 | 172 | 169 | 166 |
| Quality Product 1 | 1,85 | 1,85 | 1,85 | 1,85 | 1,85 | 1.85 | 3.73 | 3.71 | 3.66 | 3.55 |
| Quality Product 2 | 1,83 | 1,58 | 1,63 | 1,68 | 1,73 | 3.68 | 4.58 | 4.51 | 4.41 | 5.20 |
| Quality Product 3 | 4,68 | 4,58 | 4,48 | 5,33 | 5,18 | 5.03 | 5.80 | 5.66 | 5.51 | 5.30 |

The minimum possible estimate for R&D is 61, which corresponds to 1 star, less estimate is impossible. Next star is 81 points, etc. step is 20:

1．> 60 - 1 star

2．> 80 - 2 stars

3．> 100 - 3 stars

4．> 120 - 4 stars

5．> 140 - 5 stars

 Formula for calculating the number of stars for R&D - (Product estimate - 60) / 20

For example, estimate for the product is 96, count the number of stars - (96 - 60) / 20 = 1.8 - the result is always rounded up and equal 2 stars.

Quality estimate in R&D depends on:

1．Getting R&D

2．Implementation of R&D

3．Aging of product

 Getting Minor gives +6 points, getting and implementation of Minor occurs immediately.

Getting Major gives +6 points, getting Major is equal to getting Minor.

Implementation of Major gives +20 points, implementation Major additionally gives +20 points, ie 1 star. Not implemented R&D before are timeless and always increases quality estimate by 20 points.

*This explains the difference between the Minor and Major, 26 / 6 = 4.33. getting and implementation of Major more profitable to 4.33 times than Minor.*

Aging process reduces quality estimate - depending on the absolute value, estimate is reduced each period. The higher quality estimate of the product, the faster it becomes old.

|  |  |
| --- | --- |
| Number of stars | Aging |
| > 0 | -4 |
| > 1 | -5 |
| > 2 | -6 |
| > 3 | -7 |
| > 4 | -8 |
| > 5 | -9 |
| > 6 | -10 |

 When forecasting product quality estimate for R&D in the current period, you need to take an estimate of the product in the previous period and add the effect of R&D. For example, we have implemented previously received development Major, then the estimate of the product in the current period will be equal to 96 + 20 = 116. Calculate the number of stars after implementation (116 - 60) / 20 = 2.8 stars, which corresponds to aging -6, therefore 116 - 6 = 110 - a real estimate of the product for R&D. Calculate estimate into stars (110 - 60) / 20 = 2.5 - rounded, equal 3 stars.

**Assembly time**

Assembly time should be transformed from absolute time in minutes to percentage. If the assembly time for Product 3 equals 345 minutes, then the percentage will be equal 345/300 = 115% or +15% of normal time. Each additional percentage increases quality estimate of the product, but the effect is decreasing and each additional percentage has lighter weight than the previous one. The resulting score should be added to the overall quality estimate of the product. Estimate is rounded according to the rule of rounding.

|  |  |
| --- | --- |
| Assembly time, % | Coefficient |
| 1 - 20 | 0.00315 |
| 21 - 40 | 0.00310 |
| 41 - 60 | 0.00305 |
| 61 - 80 | 0.00300 |
| 81 - 100 | 0.00295 |

 For example, assembly time 115% will add to the quality of the product 15 \* 0.00315 = 0.04725. The proportions are the same for each product.

**High quality raw materials**

Also, as for the assembly, each additional percent increase quality estimate of the product, but the effect is decreasing and each additional percentage has lighter weight than the previous one. The resulting score should be added to the overall quality estimate of the product. Estimate is rounded according to the rule of rounding.

|  |  |
| --- | --- |
| High quality raw materials, % | Coefficient |
| 1 - 20 | 0.00165 |
| 21 - 40 | 0,00160 |
| 41 - 60 | 0.00155 |
| 61 - 80 | 0.00150 |
| 81 - 100 | 0.00145 |

 For example, high quality raw materials 30% will add to the quality of the product 30 \* 0.0016 = 0.048. The proportions are the same for each product.

**Overall quality estimate**

Estimation value sum from R&D, assembly time and hign quality raw materials. Than it is rounded to the nearest hundredth according to the rule. Actual error of such estimation is +/- 0.01 compared with fact.

产品质量估算

在新版本的GMC模拟器中出现了管理报告中的重要创新 - 表格“W”，其存储用于形成剩余纸张的原始数据（在计算模型开发中有用）。 但是，如果您解析工作表“W”中的每一行，那么您将看到，该行的那部分行仍然保留在行102,103,104,105,106,107中的未使用的数据。例如：

1．172

2．164

3．140

4．5.65

5．5.25

6．4.04

很容易猜到这是客户对您的产品的质量估计。以前，如果您想了解质量估算，您必须购买营销信息。但现在，您只需要转动工作表。此外，在初始数据估计中不是以星号（\*）表示，而是以数字表示。通过比较不同的管理报告，可以找出质量估算的形成机制。

产品质量估算由三部分组成：

1．研究与开发（R＆D）

2．产品装配时间

3．优质原材料

**研究与开发**

表包含10个时期的质量估计（包括5个历史时期）。

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 期数 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 产品1估算 | 96 | 96 | 96 | 96 | 96 | 96 | 134 | 133 | 132 | 131 |
| 产品2估算 | 96 | 91 | 92 | 93 | 94 | 133 | 151 | 149 | 147 | 164 |
| 产品3估算 | 153 | 151 | 149 | 166 | 163 | 160 | 176 | 172 | 169 | 166 |
| 产品1质量 | 1,85 | 1,85 | 1,85 | 1,85 | 1,85 | 1.85 | 3.73 | 3.71 | 3.66 | 3.55 |
| 产品2质量 | 1,83 | 1,58 | 1,63 | 1,68 | 1,73 | 3.68 | 4.58 | 4.51 | 4.41 | 5.20 |
| 产品3质量 | 4,68 | 4,58 | 4,48 | 5,33 | 5,18 | 5.03 | 5.80 | 5.66 | 5.51 | 5.30 |

研发的最低可能估计值为61，对应于1星，估计不太可能。 下星是81分等等步20：

1．> 60 - 1星

2．> 80 - 2星

3．> 100 - 3星

4．> 120 - 4星

5．> 140 - 5星

用于计算研发星星数的公式 - （产品估计 - 60）/ 20

例如，产品的估计是96，计算星的数量 -（96 - 60）/ 20 = 1.8 - 结果总是四舍五入，等于2星。

研发质量估算取决于：

1．获得研发

2．实施研发

3．产品老化

Minor得到+6分，得到并实现小数点立即发生。

Major得到+6分，获得Major等于获得Minor。

实施Major提供+20分，实施Major额外提供+20分，即1星。未实施的研发是永恒的，总是将质量估计提高20点。

*这解释了Minor和Major之间的差异，26/6 = 4.33。 获得和实施Major更有利可图比Minor的4.33倍。*

老化过程降低质量估计 - 根据绝对值，估计每个周期减少。 产品的质量估计越高，它变得越老。

|  |  |
| --- | --- |
| 星级的数量 | 老化 |
| > 0 | -4 |
| > 1 | -5 |
| > 2 | -6 |
| > 3 | -7 |
| > 4 | -8 |
| > 5 | -9 |
| > 6 | -10 |

当预测本期研发产品质量估算时，需要对上一期产品进行估算，并增加研发效果。 例如，我们已经实施了以前收到的发展专业，那么本期产品的估计将等于96 + 20 = 116.计算实施后的星数（116 - 60）/ 20 = 2.8星，其中 对应于老龄化-6，因此116 - 6 = 110 - 研发产品的真实估计。 计算为星星（110 - 60）/ 20 = 2.5 - 四舍五入，等于3星。

**组装时间**

装配时间应从绝对时间（以分钟为单位）转换为百分比。 如果产品3的装配时间等于345分钟，那么百分比将等于345/300 = 115％或正常时间的+ 15％。 每增加一个百分比可以提高产品的质量估计，但效果正在下降，每增加一个百分比比前一个更轻。 所得分数应加到产品的整体质量估算中。 估计值根据舍入的规则进行舍入。

|  |  |
| --- | --- |
| 组装时间, % | 系数 |
| 1 - 20 | 0.00315 |
| 21 - 40 | 0.00310 |
| 41 - 60 | 0.00305 |
| 61 - 80 | 0.00300 |
| 81 - 100 | 0.00295 |

例如，装配时间115％将增加产品的质量15 \* 0.00315 = 0.04725。 每个产品的比例是相同的。

高品质原材料

此外，对于组装，每增加一个百分比的产品的质量估计增加，但效果正在下降，并且每个附加百分比的重量比前一个更轻。 所得分数应加到产品的整体质量估算中。 估计值根据舍入的规则进行舍入。

|  |  |
| --- | --- |
| 高品质原材料, % | 系数 |
| 1 - 20 | 0.00165 |
| 21 - 40 | 0,00160 |
| 41 - 60 | 0.00155 |
| 61 - 80 | 0.00150 |
| 81 - 100 | 0.00145 |

例如，优质原料30％将增加产品质量30 \* 0.0016 = 0.048。 每个产品的比例是相同的。

**总体质量估算**

研发费用，装配时间和优质原料估算值。 根据规则，它比四舍五入到最接近的百分之一。 与事实相比，这种估计的实际误差为+/- 0.01。