

Restaurant bill effect and some applications

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"Keep attention on "miscellaneous":
they are small but occasionally very
powerful.
Like ants..."

1. ABSTRACT

The proposed paper introduces and explains so called "Restaurant Bill Effect", following the presented principle by the Organizational Maturity/Stability criteria. The Restaurant Bill Effect, at the very first glance, just simply contradicts the Pareto principle, but the paper shows that these two principles rather complements one another. Essentially the Restaurant Bill Effect (RBE) demonstrates the Power of Miscellaneous, the notion extremely important in Management, which certainly is day-by-day decision making, prediction, evaluation, and prioritization of alternatives, and being restricted by different limitations and boundaries, including the budget issues. If the RBE phenomenon is evident, it means that the Pareto Principle in this case is compromised, and "the Miscellaneous" is no more the "Trivial many". The paper is discussing why the Restaurant Bill Effect is undesirable and should be eliminated. The advantages for the process/system of being "Pareto-compliant" are presented. The way of transforming the "Powerful Miscellaneous" into "Trivial many" and therefore determination of a stable and mature Vital Few is offered, as well as the Test for being certain that the "golden ratio" of Pareto Principle is achieved and can be proven statistically.

Key Words: Restaurant bill effect, Pareto Principle, Maturity, Stability, Pareto-compliance, Powerful Miscellaneous.

2. INTRODUCTION

The Pareto Principle (PP) states that, for many events, approximately 80% of the effects come from roughly 20% of the causes. In other words, 20/80, when $\approx 20\%$ is the relatively small Vital Portion (VP) of investment (population of causes), and $\approx 80\%$ is "the bulk" of the population of the results. When Pareto Principle doesn't work, we usually have to be cautious and careful. One of such cases is the Restaurant Bill Effect [Bluvband Z., 2014], which actually is complementary to the Pareto Principle. The Restaurant Bill Effect is naturally known to people who from time-to-time are visiting restaurants and eat without special cost constraints, diet restrictions and control:

"Main dish, the most expensive items altogether, costs only small part of the restaurant bill".

This happens when, as usual in a restaurant, we are coming just to have fun, and things are uncontrollable and left to themselves...

To be a little bit more quantitative, one can say: "To evaluate the bill you will pay in the restaurant, take the price of your main dish and multiply it by three".

For an unexperienced restaurant guest this sounds ridiculous, because he will feel confident that the most expensive part of the deal - the main dish - multiplied by a number of visitors is (as per Pareto Principle)

the “vital few” (~20% of the meal items) and will cost nearly 80% of the bill. Then the rest, the Miscellaneous, i.e. the “Trivial many”, ~80% rest of the dishes will cost the rest of more-or-less 20%. But in reality– the Pareto Principle does not work this way...The “Trivial many” cost is the main part of the bill: almost 80%!

If to try to draw the Pareto Chart for the Restaurant Bill Effect case, the graph will shows as Fig.1 In this chart the Main Dish costs 24%, this 24% are represented by 8% of all dishes only (producing 8/24), but this does not make it a “Vital Few“ Portion...

One can see that the Miscellaneous 92% are representing 76% of the Bill!

So where is the 20/80, actually “Small portion of efforts”/”Main portion of Results”?

If we will try to reorganize straight-forward the data adding item A to main dish, we’ll get 15/34, adding one more element – 23/42, more and more – no way: Pareto Principle does not appear...

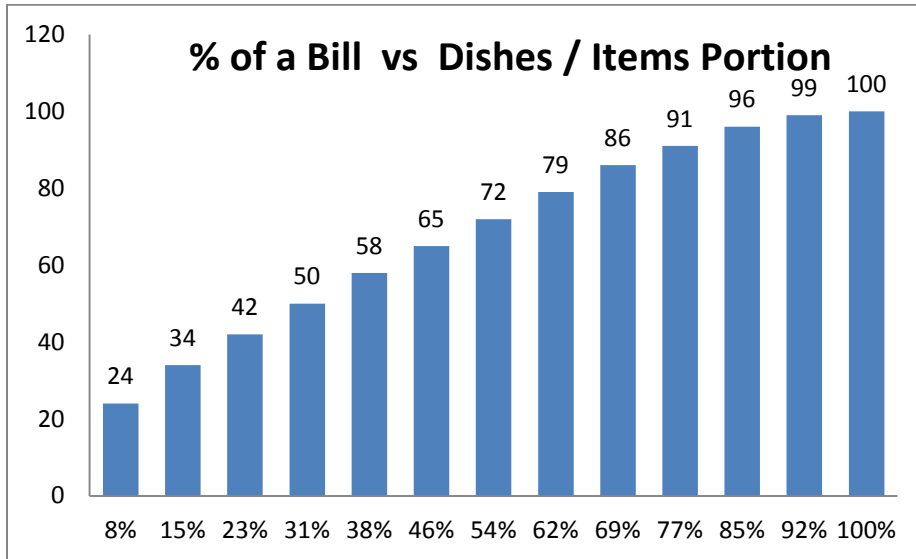


Fig.1

Therefore the Restaurant Bill Effect (RBE) one can illustrate as following on Fig. 2:

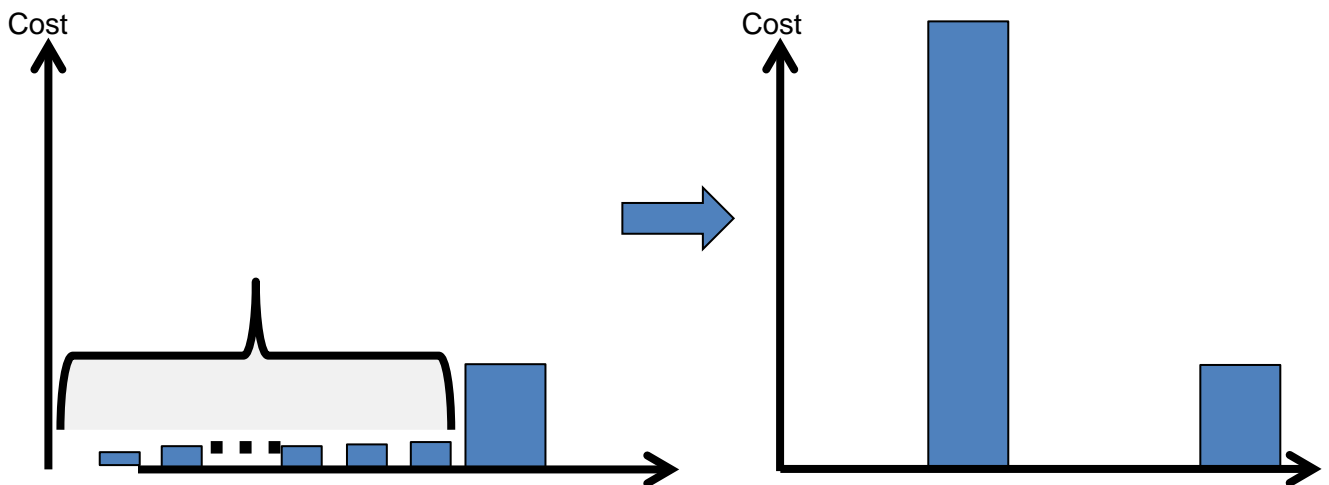


Fig. 2

3. THE POWER OF THE MISCELLANEOUS

Thus, what picture do we see here?

The miscellaneous has a great "power", they are "small" but many, you pay for all of them a lot - much more than it seems, and if you do not pay enough attention and do not control them, if you do not see them and their influence all the time, - they can represent 70-80% of the total cost.

Is it "normal" and acceptable situation?

The answer is: "No", at least "Not sure"...

To understand that, let's see some basic principles on which the Restaurant Bill Effect approach is build.

a) The first claim is as following:

"The status of a system which shows the presence of the Pareto Principle is the canonical status the system owner has to strive to".

In another words, the hypothesis stated in [Bluvband Z., 2014, Bluvband Z., Segev Y., ALD Ltd, 1994] is like that:

"Compliance of a Process with the Pareto Principle is a prerequisite for its Maturity and Stability".

Remark. In the above expression, the term "process" may be substitute by "system", "organization", "structure", etc.

Stability and Maturity of a process means the actual process Containment, and therefore Control, Repeatability, and Predictability (see the Fig.3):

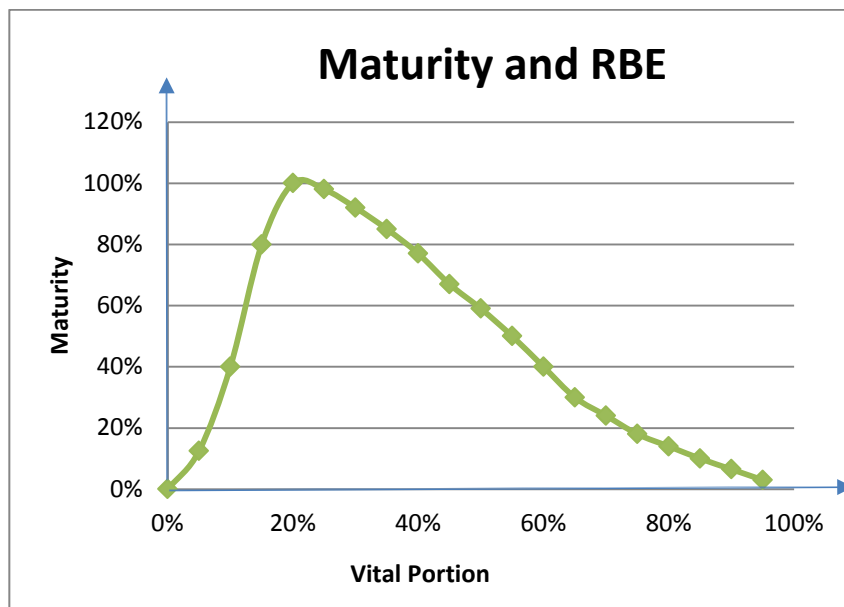


Fig. 3

For example, in a soccer game, the entire team of sportsmen (all the 11 players) is playing, but only one of the players, usually just the striker, an attacking forward, scores a ball.

.In [Korolev V.A] this soccer team situation is presented and stated that: “Without going into a detailed study, one may declare: that to such a situations, where there are to be systemic effects, "Pareto principle" does not apply”...

It's not easy to agree with this conclusion.

Every mature soccer team has 2-3 players frequently conquer the gates...

Consider the game score as a main and objective outcome of this sport contest, these 2-3 players are the Vital Portion of the team. That makes the Vital Portion of the team be in the area of 20%: $18\% \div 27\%$ ($2/11 \div 3/11$).

Remark. In this example the team quantity was taken as standard per a game quantity of 11 players, what is based on the assumption that relational amount of payers with specific abilities is same when “bench players” will be taken into account as well.

Certainly, this Vital (few) Portion brings only the main outcome of the game, not whole the outcome! That concurs with the Pareto Principle.

The wrong conclusion of the inability of apply the PP is, probably, based on the wrong understanding of the conclusions, like getting rid of less important players (like getting rid of the employees in production conveyor performing less significant operations).

The real use of PP is not eliminating the trivial many, but mainly reorganizing it. On the other side, the main attention should be paid to Vital Portion - to achieve and then keep maturity and stability of the organization.

Take, for example, the Brazilian team in the last World Cup (FIFA) 2014...

In this championship Neymar justly was selected as captain of the Brazilian national team. Neymar was named player of the tournament and received the Golden Ball Award and the Adidas Bronze Shoe.

Neymar was their leading player in the league, and, of course, scored a lot of relatively goals (four) before the irreparable happened: In the quarterfinals, at the end of the match, Neymar was put on a stretcher and replaced after knee of a player of the opposing team - Juan Camilo Zuniga - (no one knows whether or not it was an accident?), "crashed" into the back of the remarkable Brazilian football striker - leader.

Neymar was taken to hospital with the diagnosis "vertebral fracture", which stopped his performing at the rest of the tournament...

Without him (and without another key player - a central defender of the Brazilian national team - Thiago Silva, who was suspended for his second yellow card in the quarterfinals of the tournament), the team has lost Vital few portion of the team ($2/11 = 18\%$) and almost could not play. Consequently the famous losing 7: 1 happened. From replay moments of the match can be seen that almost all scored goals were scored through the center, i.e. where there was no Thiago Silva!

The Maturity and Stability, and therefore Control, Repeatability, and Predictability of the team were compromised.

One can see the explained result using the chart on the Fig.3.

Remark. I am using examples from the world of arts, sports and restaurant - for two reasons:

1. These examples are well known and understandable to all, almost without exception.
2. They are also typical as a model for our study.

b) The second claim is as following:

“The “too powerful” miscellaneous should be converted into the “trivial many””

Or, in another words, Restaurant Bill Effect is negative status of a process and should be eliminated, while transforming the process status to be more mature and stable, i.e. become Pareto-compliant.

The redundancy which will exist due to the miscellaneous converted to the trivial many existence is one of the necessary conditions for long-term sustainability of the process, its evolutionary flexibility, variability and adaptability.

The Pareto Principle ratio 20/80 is the “golden balance” between the main effort and main effect of this effort. Therefore, Pareto-compliance is the desired potential state of the process (system, etc.) and should be achieved first, before we are treating the Vital few elements - as a convenient shorthand for cutting down on Time- or Cost-wasting activities, focusing on what is truly important.

This sounds good, clear and very simple...

But let's slightly paraphrase the famous H. L. Mencken's Metalaw [Bluvband Z., 2002] rule: “For every complex problem there is an answer that is clear and simple, but may be wrong”.

So what is the way to convert it?

Given that, it is reasonable to investigate and understand, what is the practical way to do the transformation of the Restaurant Bill Effect's Powerful miscellaneous- without being wrong?

4. CONVERSION OF THE “POWERFUL MISCELANEOUS” TO THE “TRIVIAL MANY”

The Restaurant Bill Effect is a principle emphasizing "the power of miscellaneous" (see. Fig.1). It shows the importance of Management Control over the elements gathered one-by-one but together - under article "miscellaneous". The result of such a control should be conversion of this miscellaneous to the “trivial many”.

One of the methodologies to mitigate the influence of the “powerful miscellaneous” is performing an analysis, when for every item we decide some attributes on similar to automotive FMEA scale 1-10, like Occurrence (O, How Frequent it is), Importance (N, Necessity, how strong one needs it) and Detectability (D, Ability to on-time Detection and Control):

Item “i” score is PPI_i (Pareto Priority Index) [Bluvband Z., 2002, 2003, 2011; Hartman B, 1983],

$$PPI_i = O_i * N_i * D_i,$$

D_i, as Detectability and Control actions, are not just theoretically existing potential activities: management should chose and apply such controls, diminishing the influence of the Item “i”.

For example, in the case of the restaurant visit, such Control is carried out by means of a request not to spill drink (water or vodka) equally to all guests, and thus Occurrence of this item “i” will be limited.

Therefore, according to the PPI “i” the new controls as new practical procedures will be found, implemented in the practice and regularly applied, influencing the statistical appearance of item “i”.

5. TEST FOR PARETO-COMPLIANCE

So, after applying decided procedures, we will get some statistics of appearance of the entire spectrum of the given Miscellaneous.

How one can see whether or not the process is getting closer to be Pareto-compliant one?

First of all, let's through the Deming approach catch better the idea of Pareto Principle.

Managers make up a small minority, like 20% of all employees of the organization are responsible for 80% of the effective results of the organization. The remaining 20% of the results depend on the 80% of the "working hands".

Note. Deming himself has been observed that there are organizations in which this Deming rule escalates to 95% / 5%, i.e. Vital few leaders - are responsible for 95% of success, and the remaining 5% (only 5%!) only are in the hands (both literally and figuratively) of production workers. It is obvious that the higher the automation, the less significant contribution of the "worker at the bench", which corresponds to the particular case of PP, like 20/95.

Thereby the Pareto Principle (PP) can be formulated as follows:

The principle of "X / Y",

wherein X is small ($X \ll 100\%$), and Y is close to 100% ($Y \sim 100\%$).

Let's define the statistical hypothesis test, to decide, whether or not after applying the decided procedures, the process became to be "Pareto-Compliant".

For Pareto Principle X/Y, test of Hypotheses:

1. $H_0: p=Y$ (accept, that Pareto Principle takes place),
2. $H_1: p<Y$ (reject H_0 , i.e. Restaurant Bill Effect takes place).

where

Y is the **minimal acceptable percentage** of the **Output (results) of the process** (i.e. cost) the process have issued by the **maximum acceptable as the "Vital few" percentage X** of the **efforts**.

For example, 30/75 ($X=30\%$, $Y=75\%$) is such a recommended pair of the above percentages.

It means, that for every trial number "k" of the process, we take the minimum relational quantity of X% of the most productive efforts and sample the integrated amount C_k out of CT_k (total result of the trial "k").

3. For the purpose of the test, let's take sample size n: i.e. n trials of the process.

Computing Test Statistics:

4. Let's calculate the sample proportion \bar{p} of the Outputs of the n trials.

$$\bar{p} = \frac{\sum_{k=1}^n C_k}{\sum_{k=1}^n CT_k};$$

5. Let's calculate the calculated value of z:

$$\bar{z} = \frac{\bar{p} - Y}{\sqrt{\frac{Y * (1 - Y)}{n}}}$$

6. Use the Critical value method: Choose z^* from the normal table to define rejection region.
7. If \bar{z} falls inside the acceptance region - accept H_0 (Pareto compliance!)
8. If \bar{z} falls in rejection region reject H_0 (still the Restaurant Bill Effect takes place!).

6. REFERENCES

Bluvband Z., Pareto principle, Deming approach and the "Restaurant bill effect", 58th EOQ Congress, Gothenburg Sweden; 06/2014

Bluvband Z., Quality Chicken or Innovation Egg, 55 EOQ Congress, Budapest, 2011

Bluvband Z., Quality's Greatest Hits: Classic Wisdom from the Leaders of Quality, ASQ Quality Press, Milwaukee, Wisconsin, 2002

Bluvband Z., Segev Y., ALD Ltd. Quality Cost and Quality Economics in Service Organizations, Proceedings the Tenth International Conference of ISQA. 1994.

Bluvband Z., Grabov P., Nakar O., Expanded FMEA (EFMEA), RAMS, 2003.

Hartman B., 'Implementing Quality Improvement', The Juran Report, #2, November 1983

James McBride & Edward Schleicher 'Failure Mode(s) and Effect(s) Analysis (FMEA)', McBride, Schleicher, & Associates, 2000.

Korolev V.A., About the nature of Pareto Principle, <http://triz.org.ua/data/c83.htm>, 2004

PFMEA, RAM Commander RAMC 7.2 New Features, ALD WEB Site, www.aldservice.com

Potential Failure Mode and Effects Analysis (FMEA), QS-9000 Reference Manual, 1995.