



K. J. Somaiya Institute of Management Studies & Research

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## *Quantinum Newsletter*



Quantinum -  
The Quants Forum

*Its all about NUMBERS...*



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The Quants Forum

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# Quantinum Newsletter

NOVEMBER 11

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## From the Faculty's Desk...

Hi All,

Hope you are reading the newsletter and like what you read. We are not receiving feedback , however. Your comments and suggestions will help us improve the newsletter.

This time, we have introduced new features like Analytics Headlines. Analytics is a bimonthly journal of INFORMS, the society for the development of OR/ Analytics.

We propose to bring new features as we go along and make the contents more interesting.

Happy reading.

Regards  
Prof N.S.Nilakantan

TEAM QUANTINUUM

## MAIN STORY : An Alternate for D/L Method

There's been a long debate in the cricketing world about the D/L rule's reliability during rain affected games. V Jayadevan, an engineer from the state of Kerala in India has proposed a new rule which gives some hope of revival in the system.

The Jayadevan system, also known as the VJD method, is a proposed method for calculating target scores in interrupted one-day and Twenty20 cricket matches. The now-defunct Indian Cricket League had begun to use this method instead of the Duckworth-Lewis method used in international matches. The VJD method takes into account the statistics from the T20 games played in the past.

Generally speaking, nobody has been able to successfully argue that either the Duckworth-Lewis Method or the Jayadevan System is significantly superior to the other, with most assessments concluding that their performance is reasonably similar.

Both the Duckworth Lewis method and the Jayadevan System use a statistical method to determine what proportion of a team's runs it is expected to have scored, based upon the number of overs faced and the number of wickets lost (traditionally referred to as the resources available to a team). However, there are two primary differences between the two methods:

- The mathematical relationship used in the Duckworth Lewis system assumes that a team's scoring rate accelerates throughout the team's innings – slowly at first, but more rapidly during the final ten to fifteen overs (the "slog overs"). Jayadevan's relationship is more empirical than Duckworth-Lewis', and assumes that the scoring rate is faster during the first fifteen to twenty overs during fielding restrictions, decelerates during the middle overs when most teams try to consolidate their innings, and then accelerates again for the slog overs. In this way, Jayadevan tries to improve upon Duckworth-Lewis' notion of the "typical innings".

- Secondly, Duckworth-Lewis is based upon a single set of curves which is used to make all adjustments to the scores. The Jayadevan method has two different curves: the "normal curves", which are used to adjust runs already scored by the batting team; and the "target curve", which is used to adjust the runs that the batting team is yet to score. Jayadevan's justification for this is that prior to a rain interruption, a team will base its batting tactics on the assumption that it has its full quota of overs available; but, following an interruption, a team can change its batting tactics to suit the new number of overs – so, if the tactics are inherently different, the curves used to calculate the run targets should also be different.

Under Jayadevan's method, the "normal" curve takes into account both the percentage of overs played and the percentage of wickets lost. The "target" curve considers only the percentage of overs played; i.e. no adjustment is made according to the number of wickets lost.

These main differences make Jayadevan's method look better than D/L method but there will always be question marks and the answers can only be derived from the future

**SABARI NATHAN**  
**PGDM-A**  
**2011-2013**

# QUANT NEWS DIGEST

## **Predicting plasma in wafer etch and deposition via quantum mechanics**

Electron-molecule collisions drive technological plasmas. Electron energies and concentrations determine the gas phase chemistry, and therefore surface effects, in all plasma etch and deposition processes. Almost all micro-electronic devices now require dry and plasma processes to achieve the necessary surface detail, yet these plasma processes are still poorly understood.

Simulation work can play a great role in understanding fundamental plasma physics, and providing insights into process optimization and development in industrial and applied settings, in a cost-effective manner.

Editor's Note:- For more details: <http://www.electroiq.com/articles/sst/2011/11/predicting-plasma-in-wafer-etch-and-deposition-via-quantum-mechanics.html>

*Compiled by Satyadev*

## **Making sense out of Indexes**

The Corruption Perceptions Index ranks countries and territories according to their perceived levels of public sector corruption. It is an aggregate indicator that combines different sources of information about corruption, making it possible to compare countries.

A country/territory's score indicates the perceived level of public sector corruption on a scale of 0 - 10, where 0 means that a country is perceived as highly corrupt and 10 means that a country is perceived as very clean. A country's rank indicates its position relative to the other countries/territories included in the index.

The 2011 index draws on assessments and opinion surveys carried out by independent and reputable institutions. These surveys and assessments include questions related to the bribery of public officials, kickbacks in public procurement, embezzlement of public funds, and the effectiveness of public sector anti-corruption efforts. Perceptions are used because corruption is to a great extent a hidden activity that is difficult to measure. Over time, perceptions have proved to be a reliable estimate of corruption.

The 2011 Corruption Perceptions Index shows that no region or country in the world is immune to the damages of corruption, the vast majority of the 183 countries and territories assessed score below five on a scale of 0 (highly corrupt) to 10 (very clean.) New Zealand, Denmark and Finland top the list, while North Korea and Somalia are at the bottom.

India is somewhere in the middle with a rank of 95 and a score of 3.1. for more information about the CPI, visit [www.transparency.org](http://www.transparency.org).

**Compiled by Prof. N.S.Nilakantan**

# Analytics NOV/DEC Headlines

## Corporate culture key to success with analytics

New research by *MIT Sloan Management Review* and the IBM Institute for Business Value reports that organizational challenges, more so than technology hurdles, are holding companies back from fully integrating analytics across their enterprises.

According to a global survey of more than 4,500 executives, managers and analysts from more than 120 countries and 30 industries, 44 percent of organizations say cultural barriers to enterprise-wide analytics adoption, such as the requirement for new leadership competencies and organizational resistance to new ideas, are the primary barriers. In contrast, only 24 percent point to technology concerns.

The new report, entitled "Analytics: The Widening Divide," builds on the findings from the original study by MIT SMR and IBM in 2010 to understand how companies are embedding analytics in more of the enterprise's processes and operations. The 2010 study found organizations fall into one of three levels of sophistication: basic users referred to as Aspirationals, followed by the more Experienced users and the most advanced users referred to as Transformed. Year-to-year comparisons reveal that the more sophisticated users are expanding their deployment of analytics and widening the performance gap over their peers.

"We've found that there are three legs to the competitive analytics stool: a data-oriented culture, information management competency and analytics expertise," adds David Kiron, executive editor for *MIT Sloan Management Review*. "Companies that have all three use analytics to deliver advantage in the marketplace."

The study found that the majority of organizations are using analytics to manage their financial and operational activities, but are less likely to rely on analytics-based insights for decisions in other key areas.

While Transformed organizations use analytics more broadly across the organization than their peers, they differentiate themselves by intensely focusing on applying analytics to three areas:

- Increasing the speed of decisions
- Managing enterprise risks
- Engaging customers.

The study examines how Transformed organizations are creating an advantage in the marketplace. The analysis shows that of all the characteristics exhibited by this group, their proficiency in six areas (represented by the percentage of Transformed companies that say they possess these characteristics) distinguished them the most:

- Ability to analyze data – 78%
- Ability to capture and aggregate data – 77%
- Culture open to new ideas – 77%
- Analytics as a core part of business strategy and operations – 72%
- Embed predictive analytics into process – 66%
- Insights available to those who need them – 65%

**Compiled by Prof. N. S. Nilakantan**

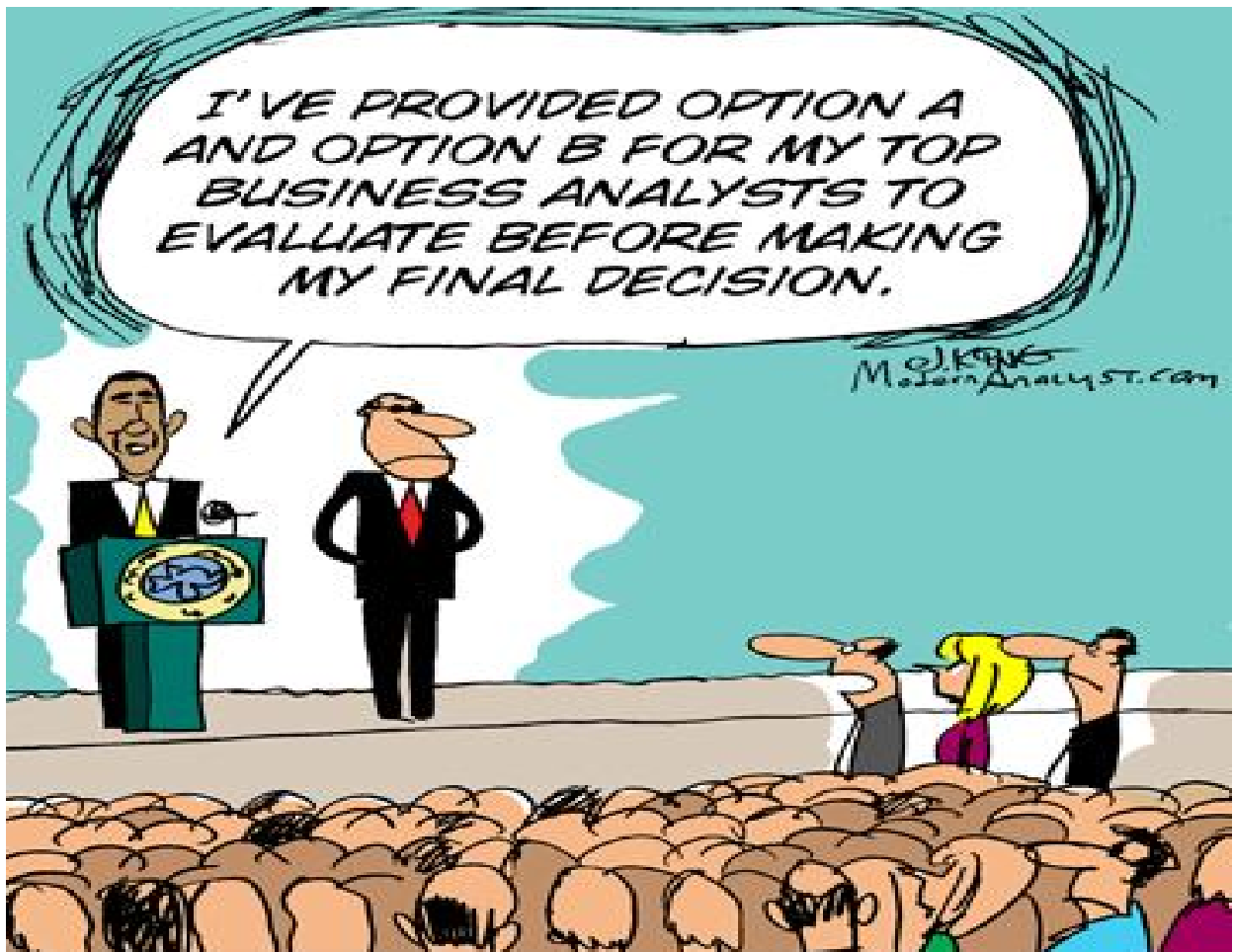
## Analytics NOV/DEC Headlines

### UPS uses @RISK for sustainability

With more than 400,000 employees and 1.1 million shipments per day, UPS is one of the world's largest shipping companies. UPS regularly monitors its environmental impact by measuring its greenhouse gas (GHG) emissions. Because there is significant uncertainty around GHG monitoring, UPS turned to @RISK to most accurately estimate these amounts.

Calculations of GHG emissions are affected by a range of variable factors such as secondary data, calculation methodologies and formulas meant to describe the relationships between various parameters and emission processes.

According UPS's 2010 Sustainability report: "Using the GHG Protocol 'Measurement and Estimation Uncertainty of GHG Emissions' guidance and analyzing the collected data through Monte Carlo simulations by using the @Risk statistical analysis software at 95% confidence interval, we are able to estimate the uncertainty for our 2010 GHG inventory."



*"Mr. President, after analyzing both options we unanimously agree...you should go with Option C."*

# Mystery Of Fibonacci Numbers

The phrase Fibonacci numbers refers to a sequence of numbers studied by a man named Leonardo of Pisa, who was nicknamed "Fibonacci". He was the first Italian person to study the sequence of Fibonacci numbers and he was also the one who spread the sequence's system through Europe in the early 13th century. Fibonacci also published the book Liber Abaci that made the sequence well-known. Today, he is known as one of the greatest – if not the greatest – mathematician of the middle Ages.

Fibonacci was born in 1170. His father was named Guglielmo and nicknamed Bonaccio (meaning good natured) and his mother, who died when he was only nine, was named Alessandra. Fibonacci was not given his famous nickname until years after his death. "Fibonacci" comes from filius Bonacci which means son of Bonaccio.

While Fibonacci himself did not discover Fibonacci numbers (they were named after him), he did use them in Liber Abaci. The numbers originate back to ancient India, and were used quite frequently in metrical sciences. Fibonacci introduced these numbers to Europe in his book, thus changing the way mathematics was seen.

The Fibonacci sequence itself can be explained like this: each number in the sequence is the sum of the two previous numbers in the sequence. Therefore, the sequence begins with 0, and then continues on like this: 1, 1, 2, 3, 5, 8, etc. The higher up the chain you go, the consecutive numbers would also then be divisible by each other to obtain what's called the "golden ratio" that became a staple in Renaissance painting proportions. The ratio works out to be 1:1.618 which painters used to proportion their work because they believed it to be much more aesthetically pleasing. This same ratio is found time and again in nature as well, making it fascinating for scientists to study the sequence organically.

**SABARI NATHAN**  
**PGDM-A**  
**2011-2013**

# It's All About Numbers

## ONE

Just **one** minute of exercise a day could prevent diabetes, researchers claimed today. Performing short cycle sprints three times a week could be enough to prevent and possibly treat type 2 diabetes.

Scientists at the University of Bath asked volunteers to perform two 20-second cycle sprints on exercise bikes, three times per week. After six weeks, researchers in the university's Department of Health saw a 28 per cent improvement in their insulin function.

Type 2 diabetes occurs when blood sugar levels build up to dangerously high levels due to reduced insulin function, often caused by a sedentary lifestyle. The condition can cause life-threatening complications to the heart, kidneys, eyes and limbs, and costs the NHS £1 million an hour in treatments and care.

In the study the resistance on the exercise bikes could be rapidly increased so volunteers were able to briefly exercise at much higher intensities than they would otherwise be able to achieve. With an undemanding warm-up and cool-down, the total time of each session was only 10 minutes.

The study, published in the European Journal of Applied Physiology, is now being extended with more volunteers to determine if the exercise sessions can be made even shorter.

Read more: <http://www.dailymail.co.uk/health/article-2071590/Just-MINUTES-exercise-week-prevent-diabetes-say-scientists.html#ixzz1q0VOr1Fj>

## TWO

Manta rays are **two** distinct species

Manta rays regularly visit "cleaning stations" where small wrasse fish clean them of parasites.

It was recently discovered that mantas, found throughout the world's tropical and semitropical waters, are actually at least two distinct species—the smaller mantas familiar to divers and their larger, more reclusive relatives, which migrate long distances in the open sea. Unlike stingrays, manta rays do not have venomous tail barbs.

## THREE

There are more than 3,000 species of mosquitoes, but the members of **three** bear primary responsibility for the spread of human diseases. Anopheles mosquitoes are the only species known to carry malaria. They also transmit filariasis (also called elephantiasis) and encephalitis. Culex mosquitoes carry encephalitis, filariasis, and the West Nile virus. And Aedes mosquitoes, of which the voracious Asian tiger is a member, carry yellow fever, dengue, and encephalitis.

More to follow in the next editions.

**Compiled by Prof. N S Nilakantan**



## Broad differences b/w Quantitative & Qualitative Methods

### QUALITATIVE METHOD

Seeks to capture the complexity of issues in their interrelatedness rather than discrete variables (a holistic approach).

Used to give depth to findings, usually by focusing on information from individuals.

Largely answers the questions "why" and "who".

Based on a school of thought that recognizes a multitude of realities.

Often inductive process of inquiry – discovering, letting issues evolve, looking for patterns.

Information generated expressed mostly verbally or visually.

### QUANTITATIVE METHOD

Separates and simplifies processes into variables for analysis purposes.

Looks at trends and prevalence's within a population area (breadth of information)

Largely answers the questions "what," "how many," and "for whom".

Based on a school of thought that assumes a single, objective reality.

Mostly deductive-based on predetermined question and hypothesis.

Information generated expressed mostly in numbers (proportions and percentages).

**SATYADEV  
PGDM-B  
2011-2013**



4 November 1939 –

## QUANT TRIVIA

"32 is  
the  
smallest  
non-  
trivial  
5<sup>th</sup>  
power "

# QUANT GURU of the MONTH

## IMPRINTS OF A GENIUS—SHAKUNTALA DEVI

**Shakuntala Devi** is a calculating prodigy who was born on November 4, 1939 in Bangalore. She is commonly known as the 'Human Computer' because of her extraordinary talent and skill in solving complex mathematical problems without any mechanical aid. Her calculating gifts were first demonstrated while she was doing card tricks with her father when she was three. By age 6, she demonstrated her calculation and memorization abilities at the University of Mysore. Again at the age of 8, she had success at Annamalai University by doing the same. In 1977 she calculated the 23rd root of a 201-digit number mentally. She did this 12 seconds faster than the Univac-1108. On June 18, 1980 she demonstrated the multiplication of two 13-digit numbers  $7,686,369,774,870 \times 2,465,099,745,779$  picked at random by the Computer Department of Imperial College, London. She gave the answer in 28 seconds. However, this time is more likely the time for dictating the answer (a 26-digit number) than the time for the mental calculation (the time of 28 seconds was quoted on her own website). Amazing!! Her correct answer was 18,947,668,177,995,426,462,773,730. J This event is mentioned on page 26 of the 1995-Guinness Book of Records.

### Professional Life of Shakuntala Devi

Through her expertise, Shakuntala Devi also motivates the young minds to discover the world of mathematics. She maintains that a child's interest and receptiveness during infancy and childhood can never be matched, and the young minds must be nurtured by offering the right education process and inspiration to develop the inborn strengths possessed by every child. She has been travelling around the globe performing for the student community, Prime Ministers, Presidents, Politicians and Educationalists. Shakuntala Devi is an outstanding astrologer as well and gives remedies based on date and time of birth and place. Her clients include celebrities and well known personalities.

### Shakuntala Devi as an Author

Shakuntala Devi has authored a few books. She shares some of the methods of mental calculations in her world famous book, Figuring: The Joy of Numbers. Puzzles to puzzle You, More Puzzles to puzzle you, The Book of Numbers, Mathability: Awaken the Math Genius in Your Child, Astrology for you, Perfect Murder, In the Wonderland of Numbers are some of the popular books written by her. Her book, In the Wonderland of Numbers, talks about a girl Neha, and her fascination for numbers.

**HARSHITA SRIVASTAV**  
PGDM-A  
2011-2013

## FUN FACTS: Quants in a lighter vein

The Mathematical Milkman of Puzzleland

The school children were returning to their homes when they met the mathematical milkman, who propounds the following problem:

In one of the two cans there is milk which is so rich with cream that it becomes absolutely necessary to dilute it with a little water to make it wholesome.

Therefore, in the other can there is some pure spring water, now I proceed to pour spring water from can No. 1 into can No. 2 sufficient to double its contents, and then repour from No. 2 into No.1 enough of the mixture to double the contents.

Then to equalize matters, I again pour from No. 1 into No. 2 to double the contents of No. 2 and find the same number of gallons of milk in each can, although there is one more gallon of water in can No. 2 than there is milk, so I want you to tell me how much more water than milk is there in can No. 1?



***"Breaking News: archaeologists attribute the successful construction of the pyramids to the Egyptians' advanced analysis skills. They have uncovered an ancient Business Entity Model and a Process Flow Diagram."***

Editorial Team

“Pure mathematics is, in its way, the poetry of logical ideas.  
~ Albert Einstein”

# QUANT QUERY OF THE MONTH

## Sudoku of the Month

				9	3		2
5			8		1	7	
	8	9					
	2		4				9
9			1		2		5
	7				6		3
						1	8
		8	3		7		2
	9		6	5			

Answers and name of solvers will be published in the next issue. Mail your answers to [simsr.quantinum@gmail.com](mailto:simsr.quantinum@gmail.com)

### Solution to last month's quant query 1 of the month

Each character represents a unique number, say A=2. Guess the characters

$$\begin{array}{r}
 \text{SEVEN} \\
 \text{SEVEN} \\
 + \text{SIX} \\
 \hline
 \text{TWENTY}
 \end{array}$$

Solution:-

$$\begin{array}{r}
 68782 \\
 68782 \\
 + 650 \\
 \hline
 138214
 \end{array}$$

i.e. S=6, E=8, V=7, N=2, I=5, X=0, T=1, W=3, Y=4

No body sent the right answer for the last month query.

Editorial Team



*Quantinum, the Quant's forum of KJ Somaiya Institute of Management Studies and Research is formed with two objectives. Firstly to remove the common myth from the students mind that mathematics is difficult. Secondly to give students an exposure on how to make decisions in real life business problems using quantitative techniques. This helps to bridge the gap between theory and the practical application.*

*For any further queries and feedback, please contact the following address*

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