INDUSTRIAL VISION

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Volume 4.0 | 2017



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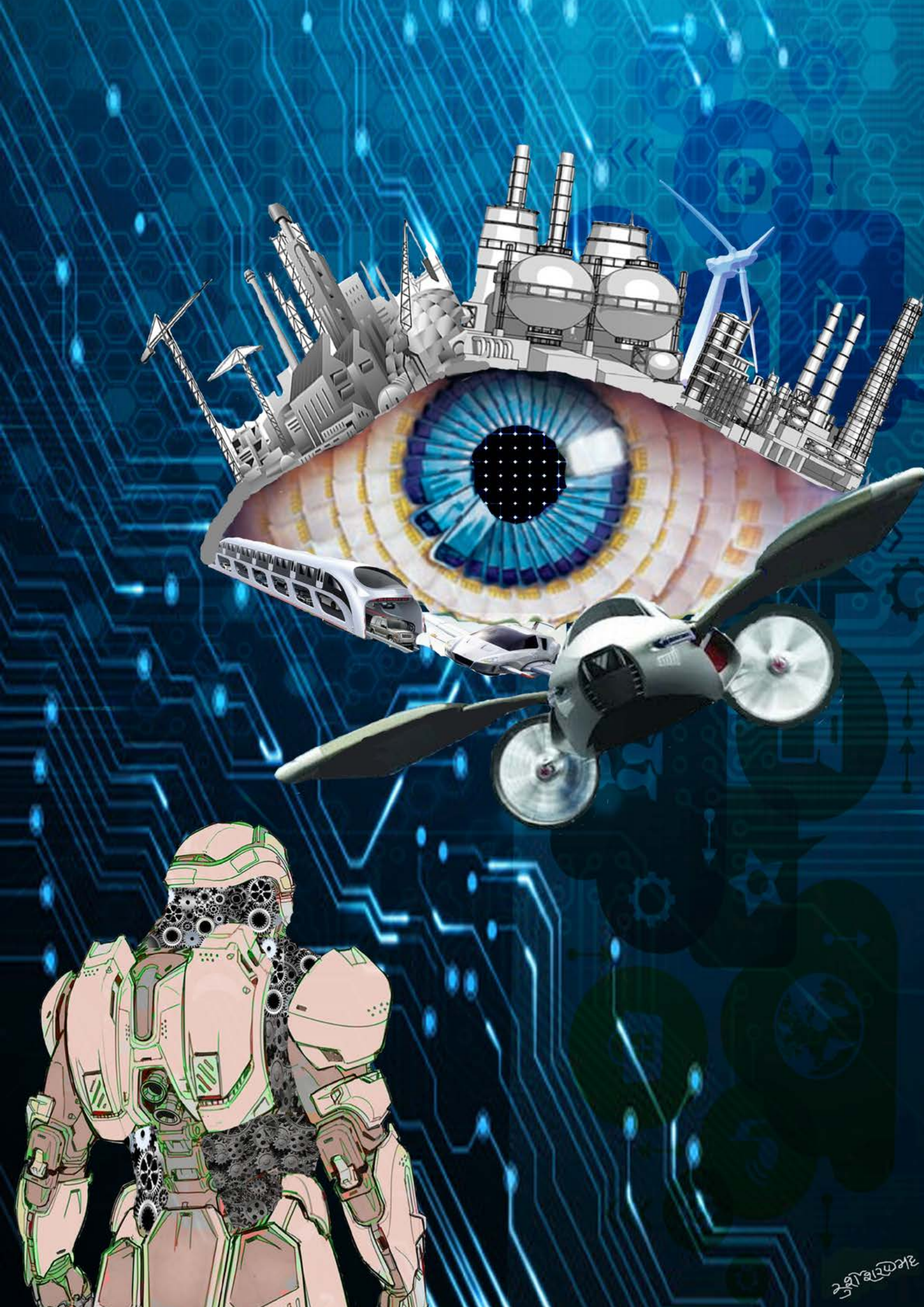
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A note to readers

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EDITOR'S NOTE

Year 2016 was a surprisingly great year for the automobile industry with market growth rate of a whopping 30%. The statistics of Trade and Export Promotion Centre (TEPC) showed that the country imported vehicles and parts worth Rs.46.9 billion in the first half of ongoing fiscal year against Rs.17.5 billion worth of vehicles and parts imported during the same period of the previous fiscal. While this is pleasing news at the auto industry frontier, a more pressing issue has come to light.

The domestic automobile market is growing, but so is the number of vehicles on the road. The roads of city areas especially Kathmandu Valley is jam-packed and traffic congestion is a rampant urban problem. The Solution?Widen the roads? The road network expansion project had been talk of town for quite some years. Slow paced for the past few years, road expansion project is now gaining speed. Seemingly this is doing more harm than good. Now dusty roads, demolished areas have changed the scene of the city not to forget the subsequent air pollution. The road expansion project is simply "serving the old wine in a new bottle" according to the experts.

While road expansion is imperative to address the intensetraffic congestions in the cities, it is only a temporary solution. The road network expansion at cost of pedestrian safety and degradation of air quality cannot be the road to development. The number of vehicles will only increase and if no plans are made for mass transits, the traffic mobility will only degrade.

The Real Solution? Transport Automation? The automation seems to be at the forefront of solving the issue. Mass transits are a must for cities like Kathmandu and transport automation will likely be the sustainable choice. The government has already started mass transits with Saanjha Buses on the roads so automated transport could be the next big step. But would it be as easy as it seems for a developing country like Nepal.

So the big question still remains if automation could be the answer to our transport problems. Skepticism about automated transport is predictable but it could be the next big thing if implemented correctly Jonathan Wilkins, an expert on the subject weighs the pros and cons of automation in the developing countries. (pg 51)

This issue's magnificent array of research, trending innovations and analysis in industry and management sector is a keepsake- with the perks of social media marketing to why industry retrofitting is important, the issue has it all. The latests of the industry is here. Enjoy!



Riti Newa
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Data Science

A thrilling career for Industrial Engineers

By Er. Bikram Dahal

"In 2012, Harvard Business Review named data scientist the "sexiest job of the 21st century." More recently, Glassdoor named it the "best job of the year" for 2016 and McKinsey & Company projecting a global excess demand of 1.5 million new data scientists."

In layman term, data science is making data talk, taking useful and productive information out of boring set of data. Data have swept into every industry and business function and are now an important factor of production, alongside labor and capital. So you ask why it is such a big deal. With big data comes big responsibility, you may have 10 GB of data but only 10kb may be useful, that where data science shines. Data science employs techniques and theories drawn from many fields within the broad areas of mathematics, statistics, operations research, information science, and computer statistical learning, data mining, database, data engineering, pattern recognition and learning, visualization, predictive analytics, intelligence, and high performance computing to extract knowledge or insights from data.

You may be thinking, wow it's too much, it's like combination of computer science graduate, math major, MBA; that the reason it has high demand plus no one from single field have this knowledge when they graduate. Who has the best chance, we industrial engineer. Our IE (Industrial Engineering) curriculum consists of programming classes, stats/probability classes, linear programming, and operations research, modelling with simulation, business management, and accounting classes, along with the other core, traditional engineering classes. Some areas we are likely to be missing are unstructured data analysis, advanced machine learning techniques, and programming skills that some we have to learn. Don't worry, you neither need to use years of your life learning nor fortune to be data scientist. You just need learning attitude and internet have all answer.

> "Data science is neither a typical code writing nor a pure decision making job, it is the combination of both."

Data science is big deal across so many industries, from retail to government to biotech. Just do a google search you will know what I am talking about.

Want to be data scientist?

1. Know how to use google/ Internet: Internet has all answer you just need to learn, how to access it. You don't know excel or have confusion about anything just google it. Most important skill you need is not that you need to know everything but it's knowing how to find answer. Learn how to navigate web, how will google result change when you change few keywords in your search term. There is no shame in saying I don't know but give me time I will find answers.

2. Have curiosity: Next time you see any spreadsheet, think what insights can I get from this data? What chart can I make, from bar graph to motion chart. If its sales data try to see sales each month, week, quarter. If you see any variation in chart try to make hypotheses to explain i.e. there



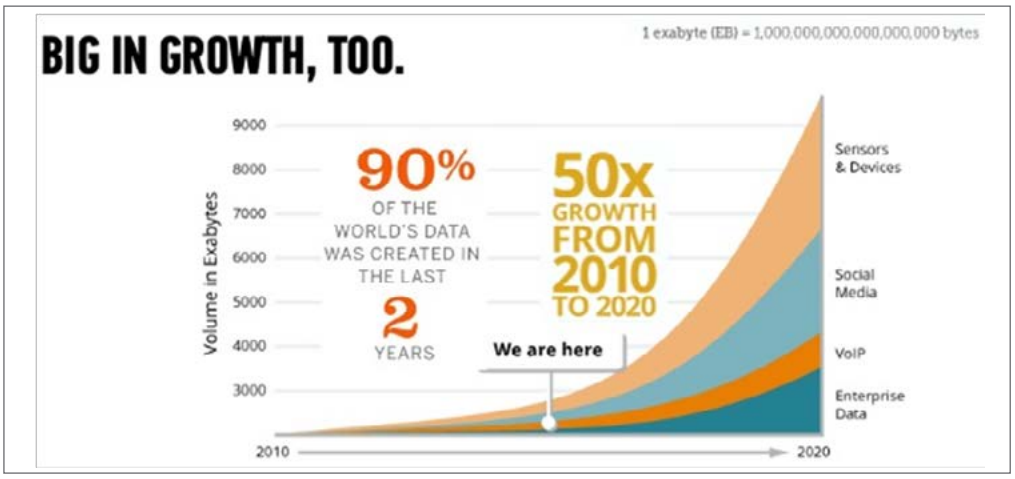
Er. Bikram Dahal is an industrial engineer and works as Business Analyst at Kaymu Nepal, Kathmandu, Nepal. He can be reached at bkrm.dahal@gmail.com.

is certain month with high sales than rest, try to find what happened in that month, was there any kind of festival , was there change in marketing budget.

3. Basic tool: R or python (I know most of you hated C programming in first semester but programming can be s lot of fun, if you use it to solve real life problem, like I have bot that saves me 3 hours a day), My advice is to learn python (R vs python- internet is filled with this debate) first as its more dynamic. At the end you will need both. Learn advance excel like PowerPivot and power query.

4. Basic Statistics: Give more attention on your math and statistics class, even if you have already pass those exam, https://www.khanacademy.org/ have you backed or you can just see other online resources.

5. Data Visualization & Communication: Data scientists need to communicate in language that all their stakeholders understand—and to demonstrate the special skills involved in storytelling with data, whether verbally, visually, or—ideally—both. Some of you will have and some of you will be like me, you will have to learn.

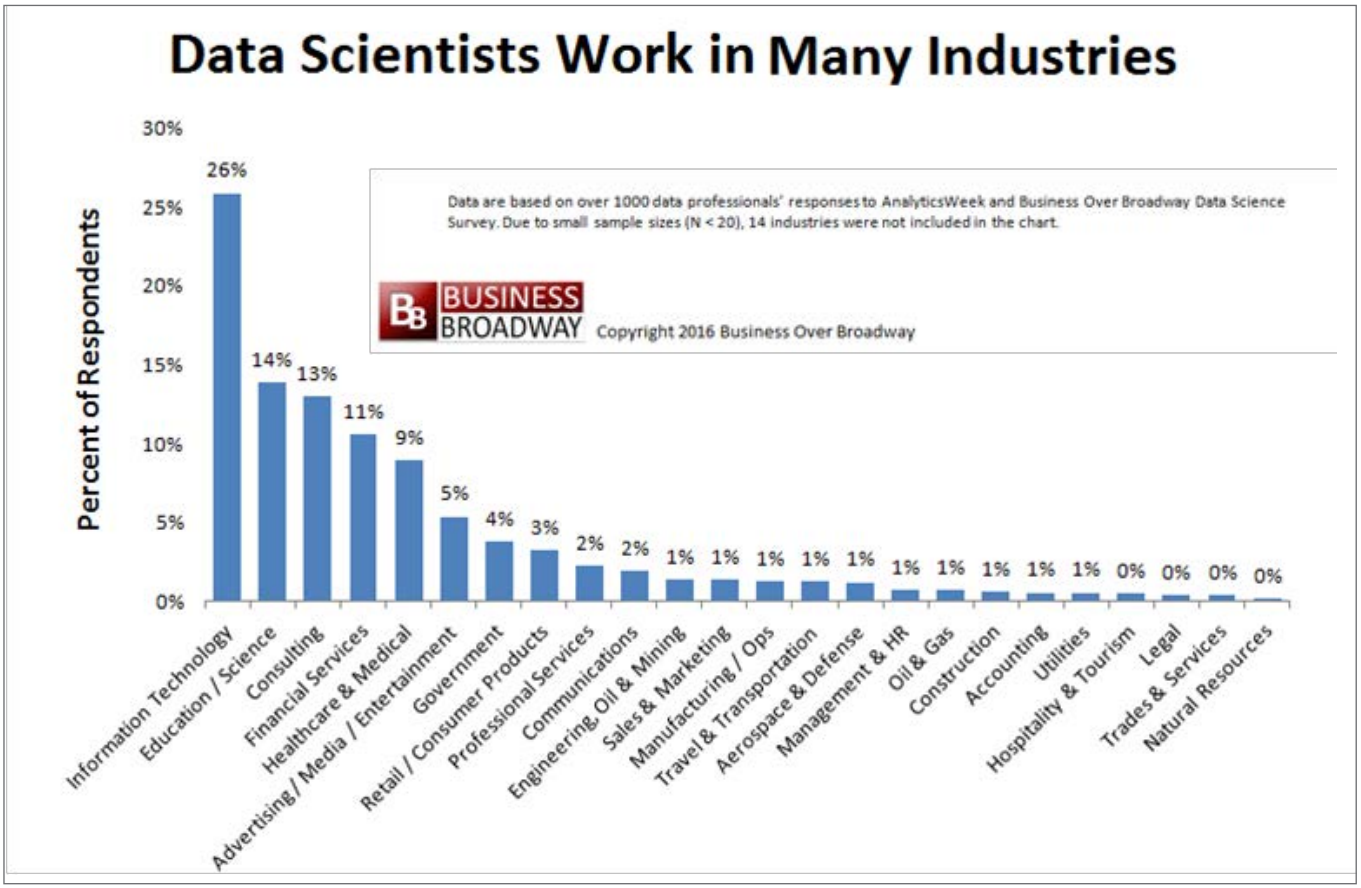


6. Read: Follow people in data science field, read blogs, book on analytics.

7. Take Online courses: Take online courses from www.edx.org, www.coursera.org, www.udacity.com etc. which courses are best, Just google and read blogs (internet can be over flooded with advice; you need to learn to filter and get best information).

Data science is neither a typical code writing nor a pure decision making job, it is the combination of both.

You should be able to make hypothesis and see if you have data to prove or disprove it, if you don't have data you should know how to collect it. You should be able to see pattern when other just see randomness. You should be able to swimming in data and get gem from deep down the ocean. IV





Open Innovation: from Research and Development to Connect and Develop

Master's thesis project in Global Supply Chain Management- Schneider Electric, Wiehl, Germany

BY Er.Sabin Silwal

I. INTRODUCTION

Open innovation is the process of opening a business valve that allows inflow and outflow of the contextual knowledge for the future of the company and its major stakeholders. The open innovation business model believes that knowledge is spread around the world and we cannot bring every powerful and necessary minded people in one place, but we can try to enlarge the circle and network to use their knowledge through different form of engagement. Innovation targeting new products creates a competitive advantage; open innovation develops this advantage fast and reliable. Chesbrough, who coined the term open innovation, defines an open innovation as a paradigm that assumes that the firms can and should use external as well as internal ideas to reach internal and external paths to market.

Procter & Gamble's radical strategy of open innovation, for example, produces more than 35% of the company's innovations and billions of dollars in revenue [1, p. 1]. In late 1980s P&G moved from a centralized strategy to a 'globally networked internal model' and beginning of this century, P&G moved from Research and Develop model to Connect and Develop (from R&D to C&D)-"Not Invented Here or Proudly found elsewhere" [1, pp. 1-3]. Many companies are still in a principle that the innovation must reside within the R&D of their company and it is the only a way to develop new products. One of the unique feature in P&G in its innovation strategy is the involvement of every production process interacting with customers [2].

> "It is time to open your innovation where your market is."

II. OPEN INNOVATION

One has to think critically and analytically to answer a simple question "who invented the mountain bike?" Mountain bike was not invented in Research lab of a big bike company or not invented by any locomotive professors. It was simply collection and modification of existing best benefits from bikes and motorbikes done by a group of young guys around northern California who wanted to have a change in their ride. This group had invented these bikes and started selling their invention to other bike lovers 10 to15 years before the big companies realized the said market and technology. After 30 years, sales of mountain bikes accounted for more than 60% of bike sales in America.

The original idea of the open innovation was argued by Henry Chesbrough who defines "conceptually, it is a more distributed, more participatory, more decentralized approach to innovation, based on the observed fact that useful knowledge today is widely distributed, and no company, no matter how capable or how big, could innovate effectively on its own" [3]. The customers or users are more empowered now and they will be empowered even



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more in coming future in all sort of industries. Not only the inventors but also the manufacturers have to meet or even exceed the customer's expectations [4]. The flexibility and the quick response to its customer's voice and choice in the manufacturing provide competitive advantages to the companies. The ideas of open innovation originated from an experience and not merely the literatures. Since the knowledge is widely distributed, the new paradigm of open innovation argues that the company should welcome necessary external ideas as well as available internal ideas in order to speed up the creation of the value [5, p. 3].

Before the industrialization era started, almost all products were used to be customized. The satisfaction of customer was very important at that time too, but there was big division in customer segment. Mass production and manufacturing standardized their products and procedures to build the products. The cost of the production went drastically low, but the market became more competitive and hence marketing was considered very crucial. Later the shift was towards striving for the customer or being customer oriented. The customer centric companies combine their perspective towards their prospective customers [6, pp. 6-8]. The innovation strategies of the companies for being successful and sustaining against law of diminishing returns also went through different stages. Initially, enhancement in the beauty of product and making them more and more customized was a success strategy. In the mass production era, cutting cost of production became powerful strategy. As the companies are becoming more and more customer centric, their innovation strategy also became customer centric. The new innovation model called open innovation model is 'from the customer to the customer'. Frank Piller and Christoph Ihl from the Technology & Innovation Management Group at RWTH Achen defined three competences of firms for open innovation [6, pp. 39-47]:

A. Disclosure competence
Firms are required to disclose their problems with their customers in order to establish a connection network with their innovative customers. The amount of disclosure is the strategic choice for an enterprise. Open innovation doesn't mean relying completely on other stakeholders for innovation.

B. Appropriation competence
The firms need to have appropriation competence to capitalize the co-produced knowledge from the customers and outsiders. Most of the times, firms might need appropriation other than property rights. For the fulfillment of the norms and legal requirements. Sometimes, the co-produced knowledge with the customers are not unique and may not be exclusive, in such cases a new competence to seek alternatives should be planned.

C. Integrational Competence
The new co-developed knowledge should be integrated to the New Product Development (NPD) process of that firm. This is what P&G recently did when they partnered with a startup company CircleUp, who provided them with an online innovation platform. Ryan Caldbeck, the co-founder and CEO of CircleUp, an online marketplace to connect individual investors with entrepreneurs, says "What Matters is Integrity." Since the customers have much degree of freedom, the ideas generated with the customers might be a complete new, therefore the company needs time and adjustments to adapt [7].

The three competences discussed in an open innovation model (disclosure competence, appropriation competence and integrational competence) define the three characteristics and concepts in the dimensions: degree of freedom, degree of collaboration and degree of involvement.

III. INNOVATION AND CHALLENGES

In an interview, Henry Chesbrough said "Corporate leaders know that half of their R&D investment is wasted, but they just don't know which half!" [8, p. 20]. Closed innovation or traditional innovation model is about finding intelligent and innovative minds, giving them interesting topics within the company, pay them good facilities and ask them to develop new products and technology.
The closed model works on following assumptions [8, p. 20] [9, pp. 252-256].

- Find the smart people in the field to work for our enterprise.
- The only way to get profit from R&D is to discover, develop and supply ourselves.
- If we discover ourselves, we will be pioneer in the market.
- Commercialize the innovations in order to win
- Create the more and more profitable ideas in the company in order to win.
- Take care of our Intellectual Property (IP) so that competitors do not take advantages of our innovation.

Open innovation can be understood as an antithesis to a dogmatic internal R&D departmental activities. Opening innovation and welcoming innovation from the world is not an easy alternative to overcome the above assumptions. Open innovation is a challenging path in balancing innovation and managing ideas. One extreme challenge is going far in outsourcing causing the danger of fostering new competitors [9, p. 253]. Quoting Chesbrough, open innovation should be like finding a new catalyst for a certain reaction, or a new compound to be more efficient in a particular application.

IV. INNOVATION IN P&G: FROM R&D TO C&D

Innovation has always been P&G's lifeblood and innovation will continue to be lifeblood of P&G's success says AG Lafley, Chairman of the board, president and CEO of P&G. Each product category needs a full portfolio of innovation in order to consistently win the customers around the world and go beyond the best competitors. P&G has a strategy to lead innovation, drive productivity and improve execution in brand building, product innovation, selling and sourcing [10, p. 24]. Procter & Gamble's radical strategy of open innovation produces more than 35% of the company's innovations, Innovation success rate is more than doubled while the cost of innovation has fallen [1, pp. 1-4].

P&G was one of four companies who were invited in a forum to discuss a paper 'intensification of innovation' in the Innovation club established by Imperial College of London. Dr Mike Addison, Larry Huston, and Neil McGlip participated on behalf of P&G, bringing with them clear understanding of the history of their company in developing new managerial and technological advancement in problem solving. The company operates in an extremely competitive and mature global market and continually searching for new innovative ideas. They identified problems, one of which was operating in a closed innovation system. Gordon Brunner, Chief

Technology Officer, and Head R&D Worldwide said, he wanted to create a culture that connects people and technology in more effective way. He even emphasized that R&D could become C&D –'Connect and Develop'. Dr Mike Addison (on behalf of New Business Development) added 'Innovation is all about making new connections'. Most breakthrough innovation is about collecting and combining known knowledge in a new ways, innovation is not always starting from the wheel [11, pp. 336-337].

P&G employed more than 86,00 scientists advancing industrial knowledge for new products in R&D, but there were about 1.5 million researchers working around the world in science and technology in their areas, some with as equal expertise as P&G and some even more. The company looks for new innovations and inventions from the external resources and also connecting their technologies much better to the external benefits as well. Until 2000, P&G was in their innovation model of 'invent- it-ourselves' when they realized that this model was not capable of sustaining high growth level because their R&D productivity was almost leveled off leaving behind their innovation success rate at about 35% [1, p. 2].

The major challenge for P&G was to move company's culture from closed innovation to open innovation and people's attitude from 'not invented here' to 'proudly found somewhere', and to perceive the R&D organization of 7,500 inside plus 1.5 million outside. One of the major reason behind this growth is because of understanding the importance of growth through innovation and innovation through connecting people and technologies. In P&G, open innovation may be viewed in terms of organizational form of exploration, dynamic partnerships, relationship with competitors, supply chain relationships, networks etc. [13]. To focus their idea on C&D, they directed their surveillance to three environments: top ten consumer needs, adjacencies and technology game boards, technical changes in data mining, simulation and prototyping [14].

V. DISCUSSION AND CONCLUSION

Open innovation is about welcoming the ideas from internal and external source to make the change materialize fast enough and capitalize the benefits of change. The involvement of direct customers, suppliers and universities and techno-innovation platforms from the idea generation to product development makes the organic growth of the company and helps in expanding the global footprint [15]. Open innovation is not a management fashion rather it is a sustainable development process of research and development in business firms. Chesbrough presented the open innovation paradigm in contrast with the apparent closed innovation. Open innovation vs. closed innovation creates dichotomy but 'Open Innovation is old wine in new bottles' [16, pp. 14-16]. Almost every big enterprise implement open innovation in their own way, but they tend to skip the first step in implementing Open Innovation, which is the outsourcing of R&D in order to reduce costs, increase networks and spread risks.

The use of the term 'open innovation' will be underrated in future discussions, not because it will be out of phase or not valid, but because the word 'innovation' and 'open innovation' will be interchangeably used. Furthermore, marketing will no longer remain advertising, rather it will be problem solving of end customer and delivering the value. Marketing and innovation management will be working more and more closely; integrating an extended and complex network for the delivery of the best possible value to the end consumer.

It is proven that open innovation business model has been helping enterprises to increase their profitability. You are building a fortune company if you have customers pounding on your door demanding a specific solution to their important problems and you have suppliers offering a specific solution to the problems of your customers. Innovation should fit the market for business success. It is time to open your innovation where your market is. IV

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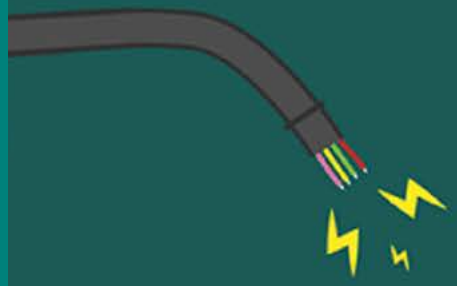
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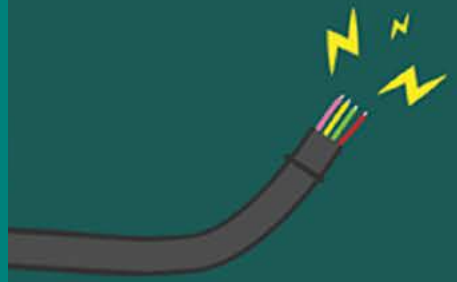
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Electricity Supply Situation in Industrial Sector



24.28%
of the total supply is lost due to leakage



1,205,696 MWh
Annual supply of electricity to industrial sector



NRs. 2.47 per unit
Loss incurred while supplying to industries



NRs.12.13 per unit
Supply cost of NEA



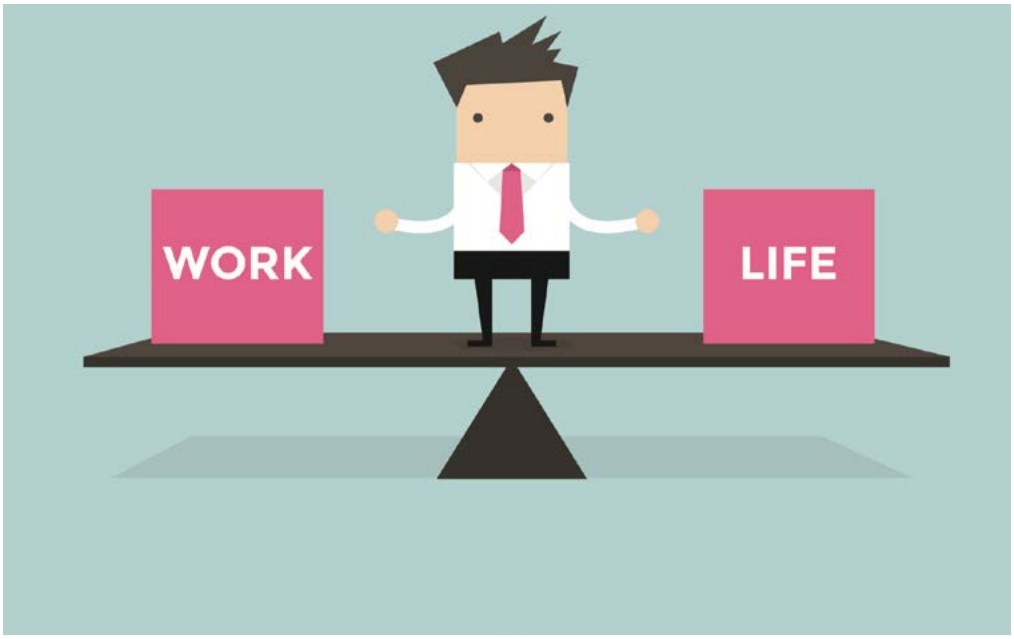
NRs.9.66 per unit
Avg. cost



892-22-01-2017 | Source: Nepal Electricity Authority

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Strike A Balance Between Work And Life

By Mohan Ojha

Take a minute and think: Are we having work- life balance? Do we prioritize our work? Are we happy at what we are doing? Do we even take our health seriously? Most of us will find that we prioritize work than our lifestyle. We consciously or unconsciously neglect our health for work as we pressurize ourselves for better performance, results, success and career growth. Prioritizing work neglecting health can be the biggest mistake that hampers us in a long run. Here are few tips on how we can balance professional and personal life without any hamper.

• ***Social networks matter:*** The most successful people tend to have the broadest and most diverse social networks. The more time and effort you put into nurturing social network, the more successful you are likely to be.

• ***Sacrificing your health for success or wealth isn't worth it:*** Successful people have a hard time creating work-life balance and can end up burning out or developing serious health problems from stress and overwork. Don't take your health for granted and take steps to mitigate stress that might cause problems later.

• ***Learning attitude:*** "Disconnect regularly and experience real life." Never stop learning. With the rate at which technologies are changing today, if you decide that you are "done" learning, you will be left behind within a matter of years, if not sooner. If you stick to only doing what you know, or what you are good at, you may quickly find that you're only good at one thing.

• ***Team work:*** "Teamwork makes the dream work" .Many people claim they don't like to work in teams, but the ability to work well in teams is vital if you want to succeed. Every big idea needs a team to make it happen without much hassle and tension.

> "Balance isn't about building an impenetrable wall between your personal and professional lives, but finding ways to connect and integrate the two."

• ***Action and Hustle:*** Worrying doesn't achieve anything. The antidote to fear and anxiety is action and hustle. If you're wasting time because you're afraid to pursue an idea, speak up, or are worried what others will think of you, you won't achieve your goals. Failure is not an end. If you give up when you fail, you'll never learn anything. Instead, look at failure as an opportunity, as the beginning of a new journey.

• ***Happiness:*** "Happiness is a journey, not a destination". So many people put off their happiness. They think, "I'll be happy when I get that job, when I lose that weight, when I'm in a relationship, when I'm out of a relationship" and so on. But we can choose to be happy. Happiness is a habit and a choice too. No matter what your situation is, if you can approach it with an attitude of happiness, you will be more successful.

Working on pressure neglecting health and your happiness may not worth much. Smart work will help not only to save your time but also to manage professional and personal life perfectly.

IV



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Women and Entrepreneurship:

Perspective of a female entrepreneur, COLUMBUS CHOCOLATES

By Palistha Shakya

Entrepreneurship is still an alien term for many of us. We think of it as any other business that many are already into and it's not surprising either because we were never really introduced to entrepreneurship. It is a process of discovering new ideas to bring together resources and do business with. There's a huge difference between just business and entrepreneurship. These days with the evolving technology and exposure of the outer world, people are more aware of this and are discovering new techniques and methods in making the daily human activities easier or are creating new interesting products.

In Nepal

If we look into the context of our Nepalese society, mostly the youth and the women are into entrepreneurship. They surely didn't get to learn it at school because sadly our education system thinks it's least important. They came to know about entrepreneurship either through social media, which is the most reachable source these days or through local trainings to uplift women in our society. Our society being male dominant, women are often held back from various opportunities as well as financial independency. This has not only suppressed the creativity which women hold but also their confidence to communicate with the outside world. As they say, 'Where there is a will, there is a way,' women are now steps ahead on the societal staircase than they used to be. Women aren't still as near to where men stand in our society but they surely aren't where they used to be and where they were told they belonged. How did this happen? The magic is women entrepreneurship.

Women as Entrepreneurs

Women these days are aware of the fact that financial independency not only gives you self confidence but also respect in the society. With entrepreneurship introduced to them, they are brainstorming ideas to figure out one big idea that can help them become financially independent.

"Women aren't still as near to where men stand in our society but they surely aren't where they used to be and where they were told they belonged. How did this happen? The magic is women entrepreneurship."

As you look around the market, you see a number of homemade products and made in Nepal products replacing every other foreign product. This is a great sign of strong entrepreneurship in our country as well as how it's helping our country's GDP. From homemade pickles to papad, to candies, to natural soaps, women entrepreneurs are producing it all locally and they're actually better in quality than those we import. Entrepreneurship, however, is not as easy and fancy as it sounds. Every entrepreneur has to face various risks but it is a lot harder for women entrepreneurs especially in our society which holds the social stigma of women being house wife material and that, women aren't supposed to do anything beyond household work. We get questioned about our values and existence if we stand against the restriction of women to work and be independent.

As a women entrepreneur, I have had my own ups and downs coming to terms with the fact that I am owning a chocolate factory.

Venturing into business with Columbus Chocolates

I describe 'chocolate' as a happy term because it makes almost everyone smile. It's your birthday? Chocolate is the answer. You're celebrating your success? Chocolate shares your happy moments. Chocolate has become a part of our celebration and we spend a lot on it almost every other day. Let's look at it from an economic perspective. Where does all the money that we spend on chocolates go? It goes to the manufacturers. Are these manufacturers based in Nepal? The answer is a straight no. The majority of chocolates



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available in our market are imported which means we're paying our income to foreign companies to purchase their products which leads to their development and not ours.

With all these facts and statistics, we thought of starting our own chocolate business in Nepal. It is called Columbus Chocolate, Nepal. It was definitely not easy as the social stigma pulled us back. I got into the business with my family as I was free after my college hours. We struggled to establish ourselves in the market which already had a number of chocolates to choose from. The competition was really tough and still is, but the primary aim wasn't to compete but to sustain. With numerous chocolate companies selling imported chocolates in our Nepalese market, we emerged from the scratch.



Firstly, it was hard to put together resources and make it available in the market. The hardship did not end there. We did not know if people would be interested in buying chocolates made in Nepal or not. We were even questioned a lot about why we were doing it when there were already enough chocolates in the market. But we knew there weren't many that were produced in Nepal. The major objective of our product wasn't just to make monetary benefits out of it but to help grow other people as well, which is why our chocolates are packed in Nepali lokta papers which are produced by women. This not only gives them an employment opportunity but also helps them financially as well as with their individual growth. When an entrepreneur sells his product, he is also paying taxes to the government, which means he is helping in the growth of National income.

Lessons Learned

Starting any business is not going to be easy but when you have a burning desire and you back it up with faith, imagination and organized planning, it is all going to lead you to achieve your goals. We chose to do this because it was our area of interest and we knew over time we would grow and we did. Columbus Chocolate is now available in market. We haven't reached our ultimate goal yet but we're definitely not where we used to be. The market is a big place and there are going to be infinite numbers of competitions or they'll start coming up eventually but that doesn't mean you should not do it. It's about giving your best and bringing out the best quality product you can to your customer. You have to know your customer and their demands.

> "The major objective of our product wasn't just to make monetary benefits out of it but to help grow other people as well, which is why our chocolates are packed in Nepali lokta papers which are produced by women."

Creating your space in the widespread market is going to be your biggest challenge, inclusive of other obstacles such as capital formation, resource mobilization, persistence, keeping up with the changing market demand. There will be a number of reasons to give up but we got to find that one reason to continue, the main reason why we started it in the first place. Nothing constraints you from starting your own business and doing what you aspire to do.

It is not going to work over night or in a week but it will definitely work out one day if you believe it will. Entrepreneurship is an art that allows you to dream, explore and most importantly, create. IV



> The ultimate goal here is to learn the pattern of human behavior from the data that we observe in everyday life. It seeks to make human life easier.

Dr. Spandan Mishra

PHD. INDUSTRIAL ENGINEER
SENIOR PROJECT ENGINEER, ACCELENT TECHNOLOGIES, INC.

Dr. Spandan Mishra is an experienced signal processing and machine learning engineer. He has a track record of delivering on a broad range of highly challenging problems such as signal processing for guided waves in aircraft skin, machine learning algorithms for enterprise inference modeling, data-driven algorithms for structural health monitoring, finite element analysis, and many more.

His specialties include Digital Signal Processing, Acoustics, Machine Learning, Non-Destructive Evaluation / Structural Health Monitoring, Sensors, Finite element analysis. He can be reached at smishra28@outlook.com.

Read as Dr. Spandan Mishra talks about his professional self, roles, experiences, big data, and some interesting and exciting things about him and his field.

1. How would you describe your professional self in a few sentences?

I like to identify myself as a data scientist. I have been lucky enough to be involved in variety of data science related project both during and after completion of my PhD.

2. What is your current role?

Currently I work as Senior Project engineer in algorithms development department at Acellent technologies, which is located in the Silicon Valley. We develop and design intelligent structural health monitoring systems for aerospace and aviation industries.

3. What are your best and worst experiences as an Industrial Engineer?

I would not be blunt in classifying any particular experience as good or bad. Being a data scientist, I would say all the experience that I have had so far have been fulfilling. It has helped me to grow as a researcher and as human being. Always seeking to strive towards excellence has been my goal. In addition, one should always brace oneself for the change!

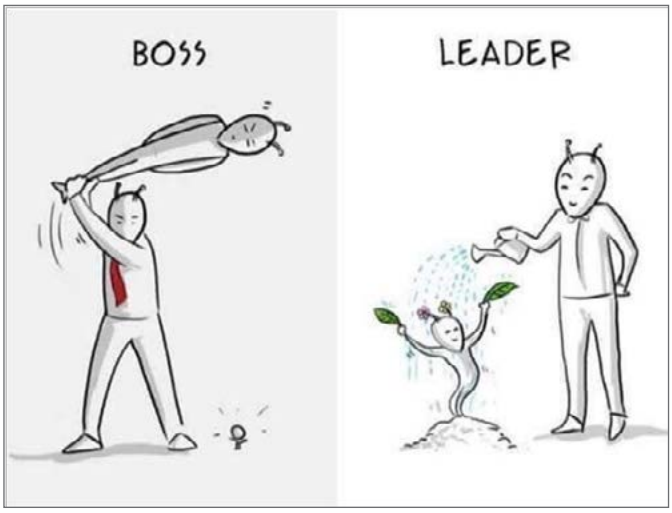
> “An efficient disaster management system can be developed by studying the human movement patterns during natural calamities using cellular phone data.”

4. Big Data and Internet of Things is currently driving the e-commerce business globally. Is it feasible in the context of industries in Nepal to use Data analytics tool for manufacturing as well as marketing?

Ultimate goal of Big Data and Internet of things is to understand the patterns presenting in DATA. Everything that exists in the universe has a pattern, Celestial bodies have pattern, human cells have pattern, micro particles have pattern.

The ultimate goal here is to learn the pattern of human behavior from the data that we observe in everyday life. It seeks to make human life easier.

Of course it’s feasible in Nepali context, not just manufacturing and marketing I see there are so many other things wherein learning from data is feasible. For example, an efficient disaster management system can be developed by studying the human movement patterns during natural calamities using cellular phone data.



5. Recently Samsung launched products face a serious case of lacking in quality assurance. How does Data analytics and statistics tool come handy while addressing such issues and shortcomings?

I do not know the nitty gritty details about the problem. But I have heard it was more related with the third party vendors from the Samsung acquired parts of the cell phones. I am very sure Samsung practices best quality monitoring tool that exists, they must be on their heels to solve this problem.

6. You have worked as an Industrial Engineer and a researcher in both Nepal and overseas. What striking differences do you find in the system between our nation and in global level?

I saw the above picture in LinkedIn the other day. This is what came to my mind when I first saw this question. They say picture speaks thousand words; I leave the rest to the readers to make their judgement.

7. What advice would you give to all the industrial engineering students and the industrial engineering community in Nepal, especially to those who want work in the research field in the future?

Work hard, be persistent. To all future researchers out there, my only suggestion is embrace the change, never cease your quest for knowledge, read the latest journal papers related to your field of interest.

8. What is the most exciting thing about your field? What can you please share a example of the kind of Data Science problems you work on at Acellent Technologies?

At Acellent Technologies, we develop the hardware and software required to build intelligent structural health monitoring systems. I work in the algorithms development department, which is a very multi-disciplinary filed, which requires knowledge of digital signal processing, machine learning, applied statistics, etc.

“Kaggle.com is very good resource to make your hands dirty with different machine learning algorithm. I am subscribed to IIE transaction which keeps me updates about recent development in the field of industrial engineering. Also, Quora is a very good forum to keep you updated about any field.”

9. What resources do you rely on to keep yourself updated with the advancements in Data Science?

Kaggle.com is very good resource to make your hands dirty with different machine learning algorithm. I am subscribed to IIE transaction which keeps me updates about recent development in the field of industrial engineering. Also, Quora is a very good forum to keep you updated about any field.

10. What was the last book that you read and liked? What do you like to do when you are not working?

Oh!! I am glad you asked this question. My reading habit ranges from political economics to historical fiction. I am currently reading, ‘Atmabritanta’ by B P Koirala, and ‘War and Peace’ by Leo Tolstoy.

I am a sucker for rock-climb, whenever I have free time which is especially during weekends; you can find me exploring outdoor rock-climbing spots around San-Francisco. IV



Is Enterprise Resource Planning (ERP) an Ally or an Enemy? The Thin Line between its Success and Failure

David A. García Barrios

The ERP systems have become very popular tools implemented by many organizations to improve their competitiveness in the business environment, however, it is not a bed of roses. If not implemented correctly, these systems in many cases can be real enemies in the fight for long-term survival and business leadership. Therefore, they can be a double-edged sword. An ERP is an IT system that can be responsible for planning and automating many organizational processes, with the objective of integrating information and eliminating the complex relationships that can arise between systems in the different areas in the company (production modules, sales, logistics, accounting, project management, human resources, finance, etc.). They are associated with goals related to obtaining real time information, the reduction of production cycles and response time for decision making, increase of quality, competitiveness and positioning of products and/or services.

The other side of the coin

We have always had the idea that without a doubt, ERP systems are tools that offer an integrated solution that provide support, control, security, and play a fundamental role as a global solution for the centralization of information. However, the key factor of its success or failure is in the exhaustiveness of its implementation, which involves the investment requirements of time, capital, and development teams, in general the redesign of the existing organizational infrastructure.

According to Forbes Magazine[1] (a leading source for reliable business news and financial information) the market for ERPs is generally dominated by five companies, since they are the most well-known or representative, either because of their characteristics, benefits or prices. While it is true that at present, various comparative studies[2][3][4] show that each provider can present advantages and disadvantages in their services in terms of functionality, customization, compatibility, hardware requirements, level of training of personnel, security, among many others. Nonetheless, the implementation of an ERP has become a real headache, since it has brought a large number of problems for many companies.

Just to mention some popular examples in the media, we have the case of Nike [5] in 2000, for a failed implementation in its software i2 ERP, the company received an estimated $100 million dollars in lost sales, collective claims and a fall in prices. The company revealed that the software contained a technical problem in its last update that prevented the correct distribution in several stores worldwide, similarly, Hewlett Packard[6] in 2004 discovered that approximately 20% of your purchase orders were not processed by his system, due to a bad implementation of

1. Columbus, Louis. Gartner's ERP Market Share Update Shows The Future Of Cloud ERP Is Now. Forbes Magazine.http://www.forbes.com/sites/louiscolumbus/2014/05/12/gartners-erp-market-share-update-shows-the-future-of-cloud-erp-is-now/#74360ea74a13 (May 12, 2014.)

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6. Ibid



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ERP Market Share	
Others	37%
SAP	24%
Oracle Applications	12%
The Sage Group	6%
Microsoft Dynamics	6%
Infor	5%
Kronos	3%
Concur	2%
IBM	2%
Totvs	2%
Yonyou	1%

SAP, this brought with it lost about 160 million dollars, bad reputation, and market loss. Likewise, according to Harvard Business Review, Levi Strauss[7] clothing manufacturer suffers estimated losses around $ 200 million dollars for errors in implementation of internal controls and reporting in its ERP system.

Although an ERP can be synonymous with efficiency, optimization, productivity, access to information in real time, communication, support for decision making, security and integrality. Implementing an ERP is an investment project. Its acquisition requires a large outlay of money, including the purchase of software licenses and the entire process of implementation, costs for maintenance of software and hardware, not to mention a large time investment, technical assistance, changes in the staff, or errors in the information, or omissions from the information, etc. For this reason, its success depends on a great extent on the right personnel choice that leads the planning, implementation, monitoring, and evaluation of integrated system.

> "They are associated with goals related to obtaining real time information, the reduction of production cycles and response time for decision making, increase of quality, competitiveness and positioning of products and/or services."

Phases on the path of success
An ERP system by itself, regardless of its functionality or monetary value, will not impact profitability if the implementation process is not correct. But how can we do that? Below, I list the important phases to consider:

1) Preliminary study:
Formalization and revision of management rules with the functional requirements. This phase requires a close collaboration with the employees of all the departments.

2) Organize the project:
This is accomplished by creating a project initiation document, which implies strategic planning and coordinated management.

3) Definition of indicators:
Establish measures to evaluate if the proposed objectives are being achieved. It is important to mention that there are many performance indicators and that each organization chooses with certain relevance to its operations. However, generally in this type of projects, financial indicators are considered, such as:

a. Return on investment (ROI):
It measures the profit that is obtained for each monetary unit invested during a certain period. Measuring costs can be easy, but measuring the benefits is complicated because they can involve many factors. For this reason, organizations set specific parameters for forecasting or estimating values, such as: percentage of inventory reduction, period of portfolio turnover, etc.



7 Bent Flyvbjerg and Alexander Budzier. Why Your IT Project May Be Riskier Than You Think. Harvard Business Review. https://hbr.org/2011/09/why-your-it-project-may-be-riskier-than-you-think (September, 2011)

b. Investment Recovery Period (PRI):
It calculates the maximum period in which the money invested is recovered, in other words, we calculate the number of years in which we recovered our money.

4) Team training:
The employees who develop the project must be trained. The implementation of the system can be considered as a new scenario that changes the operational areas.

5) Database:
The database is the central axis of the implementation project. It must be able to store, distribute and report the information to be handled at the different hierarchical levels of the organization, therefore, the database must be shared and consistent.

6) Hardware Installation:
It is one of the biggest investments of money, the old technology used to install new equipment must be replaced.

7) Software installation:
The system installation is executed in a pilot room, in which the process of installing the infrastructure, packages, configuration of modules, preferences, modifications, documentation and interfaces with other systems is carried out.

8) Total data integration:
Compilation of information from various sources in the operational areas, this is the main basis for the functioning of the system. In other words, it is the transfer of data from the old system to the new system, therefore, it is highly recommended to do integration tests and compatibility tests.

9) Execution:
Start up the ERP system. Go through the previous steps, keeping in mind that success or failure in any step can limit the execution of the whole system. Parallel to this step, a stabilization is carried out which consists of correcting any errors that may occur. It is also important to modify the procedures correctly, to evaluate and control the performance of the system and to follow up the training and training activities.

10) Continuous improvement:
Continuous feedback is very important, you should consider upgrades or new versions for system refinement.

Avoiding Issues
For the success of a company, the proper implementation of the ERP system is as important as choosing the right ERP system provider. After all, this will define the efficiency of the organization and will have a direct impact on its competitiveness, profitability and customer service. If you invest in a system full of failures with a bad implementation, it will be a great disadvantage for your firm. And it will eventually result in losing large sums of money.

It is important to evaluate your needs, taking the time to make a comprehensive analysis of the advantages and disadvantages of the information system that you want to implement. Nowadays, lack of time is not an excuse, since there are third-party firms available who can help you make the correct decision. We must be aware that companies are increasingly dependent on the integration of their operational areas and their customer data to promote good decision making. This step of the implementation is inevitably complex which is why we should pay close attention to the risks involved. IV

“We must be aware that companies are increasingly dependent on the integration of their operational areas and their customer data to promote good decision making.”

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Green Industry

The Way Forward

By Er. Ravi Kumar Mainali

Nepal, one of the richest countries in terms of availability of natural resources, has yet a long way to go. We are still very poor in the world! We have struggled for democracy for more than six decades. The country faced series of political and social movements during the last few decades. Consequently, industrial and economic movements were far off from being a major priority of the country at the time. The impending unrest and instability politically has resulted in grave industrial and economic scenario in the country.

Almost one million people are added to the workforce for employment and half-million people going for overseas employment every year for their basic livelihood.

The situations of employment promotions within the country are pathetic. Neither the key stakeholders of the government nor private sectors associations are capable enough to address the unemployment problems. Furthermore, private sectors have become more vulnerable due to long series of strikes urged by Political Parties. It is a known fact that for boosting up economic prosperity and productivity promotions of the country, political stability is the foremost factor.

Presently as political stability has been maintained the country should focus on moving towards economic prosperity. Sustainable Industrial Development and employment creation are key factors to drive forward for economic prosperity. Now, the big question is how to develop our industries to become more competitive and sustainable? A recent study showed that all developing countries in Asia including Nepal consumes more than double the amount of resources (Energy, Material, Water, and Chemical etc.) for the same level output (products or services) as compared to developed world. Thus, big amount of wastage of expensive resources is the main cause of our industries unproductive or underproductive. Due to this reason, our industries are increasingly turning unsustainable; unfortunately, converting into hundreds of sick industries in Nepal. Not only Small and Medium Enterprises (SMEs), also private or public owned large corporations have been closed due to lack of promotion of sustainable practices.

> “Creativity and technical innovation are the driving forces of the green industries of the future, starting today, and will in turn be the catalyst for green jobs, future growth and more sustainable development.”

It is highly appreciable that recently, Government (especially Ministry of Industry) is trying to open the many closed corporations which can be instrumental for the creation of thousands of jobs. However, threats cannot be undermined for sustainable development of those large corporations. How to transform and restructure such larger organizations for making industries more productive and competitive are big challenges that lie ahead of us.

Resource Efficiency and Cleaner Production (RECP) could be our answer. RECP would be pivotal in making industries more productive. On one side, resource depletion has become big challenge and pain in the neck in this planet. We need another earth to cater resources for nine billion projected populations by 2050. If we cannot shift the resource consumption trends with existing practices, our plant will



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be under immense pressure to meet the requirements of resources. Therefore, promoting practices of RECP can help industries for green movement with minimum impact on environment, eventually causing cost of products or services to reduce significantly. On the other side, a significant number of Green Jobs could be created by saving enormous resources resulting multiplier effects on the whole economy of the country. This Green Industry movement has initiated by United Nations Development Organization (UNIDO). This is how UNIDO is creating and supporting massive awareness worldwide on Green Industry. In Nepal, Industrial Engineers should carry out many research activities for the promotion of Green Industry initiatives which can be instrumental in addressing many Sustainable Development Goals (SDGs) out of 17 SDGs. It is noted that every country has specific targets and goals for sustainable development.



How to promote Green Industry initiatives?

- Strategic focus on design phase: Industries should be designed with the consideration of least resource consumption without compromising with the quality of products or services.
- Support industries to boost awareness on resource efficiency.
- Align and enforce policy framework for industries on judicious uses of resources with appropriate interventions of incentives and punishments for motivations at enterprises level.
- Institutionalize to develop more professionals and experts locally, to engage in carrying out on-site assessments on RECP practices at resource intensive industries.
- Close interface between Industries-Academia to bridge the gap between expectations of our professional graduates from industries and updating of current courseware at institutions.

Green Industry and beyond

On the top of green industry initiatives, there are many other areas to incorporate systematically which are following:

- Proper interventions of latest quality systems like Total Quality Management (TQM), Total Productive Maintenance (TPM) and Six Sigma which can enhance productivity with minimum scraps and reworks.
- Employees can be motivated towards process re-engineering which can help to conserve resources substantially.
- There will be vital roles of organizational change and development initiatives to foster morale of the employees in terms of resource efficiency measures.
- Considering employees as real assets of the organizations. More value addition can be enhanced by utilizing their maximum potentials.

The country is finally coming into terms with the rapid pace of industrialization and Green Industry can be the next big thing. Developing competent human resource on resource efficiency measures can be helpful for the demand of green industry and beyond, and ultimately for Total Industrial Productivity.

- Ensure resource optimization with waste elimination.

IV

SUSTAINABLE DEVELOPMENT GOALS





Advertisements: Social Media?

Perks of social media advertising

By Sudien Shrestha

Facebook, Instagram, and Twitter as well, in this era has become a basic supplement you use the moment you get up, while eating, while traveling or before you go to bed. Every time you click on the FB app on your cell phone, scroll past few posts , you find something about clothing, restaurant, tours and travels or maybe on your Instagram page you would find a video loading of a game. All these to your surprise you've never subscribed to and yet you can't help but notice. These are all in fact Advertisement, social media advertisements to be specific. And just like the ones you see on the newspaper or even being played on the TV you can ignore them.

So what is new about social media advertisement? Or a better question what's better about social media advertisement?

The answer: you cannot UNSEE them. Yes as simple as that.

Consider the traditional TV advertisements, after every 10 mins of your show the channel distributor plays a 3 min advertisement, and since you are not interested what do you do? You simply change the channel. Let's look at another media, newspaper, you see big chunks of pictures on one corner yet you are more interested on the news so what do you do, you simply fold the newspaper. There are always some ways to avoid the advertisements on other media.

However, the case is reversed in case of social media. Whenever you find an advertisement on FB what do you do? You need to scroll past the advertisement, there isn't like another Facebook to use to ignore, you just have to watch the advertisement being scrolled by. Similar is the case with twitter, Instagram. A better example would be YouTube, an online video sharing website. All of us have probably hated the 5 second video we must watch on YouTube, while loading the video of our choice. That also is in fact an advertisement, a very good one indeed so can you ignore that? Of course not. You have to wait till it ends.

Another key difference or more so the advantage social media advertisement is: they can be targeted to a specific group of people on a particular location. Other medias whether that be TV, radio, newspaper the advisement have limited flexibility in targeting the desired audience. An advertisement on TV means anyone who is tuned into the channel has to watch. Because of this the cost of advertisement is also quite expensive.

> "They are associated with goals related to obtaining real time information, the reduction of production cycles and response time for decision making, increase of quality, competitiveness and positioning of products and/or services."

On the contrary, social media advertisements can be directed specially to only those who are most likely to show interest on them. Social Medias such as Facebook or twitter, use the users data such as age, gender, browsing behaviour, location to preview only those ads which they are most likely to click on.

Let us look at the two giants of social media which most probably every one of us use or have used.

1. **Facebook**
2. **Instagram**

1. Facebook: anything to everything:

Facebook doesn't quite treat ads as ads. However, the main motto of the advertisement isn't anything less serious. The most distinct feature of Facebook is that it learns the social activity of the user



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adapts to it and only offers customer those ads which they might be interested in, causing the entire process of advertisement less bothering to the user.

Surprisingly there is a wide spectrum of options, may that be a simple promotional ads to full-blown campaigns you name it they have it. You can pay as less as $15 to thousands of dollars to promote your ad, and if done properly even then most inconspicuous investment can bring forth a noticeable amount of audiences. And to add cherry to the pie, Facebook is the biggest social network; your ad will be seen no matter what. Few of the permutation of Facebook advertisements are:

Traffic setup and leads with Facebook ads:
As mentioned earlier, the most useful feature of Facebook, is it allows the company to build the traffic of its own. Based on the age, gender, location, interests, country the company can aim the targeted product to the specific customer. This is a simplest and probably the most effective way of brand aiming to find more website visitors and leads. Greater the amount you pay greater is your reach towards customer. The good news is that advertising on Facebook is not expensive.

The Page Post link:
Another winner with many brands. The simple page post link should be supported by a high quality image that grabs attention. It's perfect for testing too, because you can easily change the text of a link or the image to see which performs better and when. This type of Facebook advertising is handy due to that level of flexibility and control.

Ads to increase the likes on page:
These are those little page recommendations that we get every once in a while usually after the 4the post. Direct and clear they are usually presented with the banner/ cover photo of the page. Since these ads just disappear once you like them they play a nifty trick in boosting the page likes and branding your company.

Offer ads:
These are perfectly suited to any brand that has an offer for example a festive sale, or a stock clearance. Simple to set up, they can be engaged immediately and can be targeted directly to those customers which have previously tried to create a link for example click on the related advertisement. Offer ads are small straight to the point ads referring to specific product of the company.

Sponsored stories:
This may sound quite sophisticated but sponsored stories allow you to highlight engagement. Each time someone interacts with a post, a similar story pops up which best links with the post. Facebook manages to show the right story on the post so that the line between advertisement and a normal post can be blurred. It works differently to other ads in that it shows a little more social proof. This often works well for established brands, or alternatively up and coming brands that want to make a name for themselves and illustrate a clear fan base.

2. Instagram

It has not been quite long that Instagram has introduced advertisement. Initially weird to see people were even in doubts how a mere square photo can produce an audience to the advertiser. Surprisingly, the new kid in the block has been a favourite tool for many on growing companies. . Advertisement in Instagram is purely visual and minimum texts. It was built on the image, and its advertising options are built on the image too. Since the main motto of Instagram is minimalism there isn't much offered. However it is bound to grow in the near future. In general Instagram offers three main forms of advertisements. They are:



Photo ads:
Just like a regular post these photo ads appear in your home screen. The sponsored ad simply fashions a beautiful image that you have provided and displays it to onto the home screen of the user. The photo will ever have a caption, like, comment or a share button. Anyone interested can click the link which is attached just below the photo

Video ads:
Video ads are exactly like photo ads. Though different from Facebook or YouTube, they behave in similar way. Like a TV ad within 60 seconds the entire ad will be played in a landscape format. A touch of cinematography would greatly enhance the beauty of the ad, after all Instagram is all about the bling effect,

Carousel ads:
These are perfect for companies trying to show of multiple items in the same ad in a more managed and minimalistic manner. The user has the freedom to swipe through the products if they are interested in ad. If not its just a single picture being shown at a time.

Social media advertising how to?

Let's take a quick look at few tips to get the most out of social media advertising. Following these when planning and implementing a social media advertising campaign should allow avoiding some of the problems that so many brands find themselves facing.
Bull's eyeing the perfect customer:

Probably the key to any impressive social media campaign. A company must able to identify what groups of audiences will the product be able to allure.
Setting up well-trodden path to connect with your customers is the main perquisite for many brands. If you know the channel you are working on like the back of your hand, you will know exactly what investment to be done in which ad, at what time to get the best of both worlds, i.e. wise investment and good customer feedbacks. Once you are aware of the channel you work on you'll know exactly how your typical customer will behave

with every move you make. Are you a sole owner of your own company who runs an individual ad page? Focus on Twitter with your advertising. Tailor your ads to meet their needs and pain points.
A normal retailer who sells to younger people anything from cloths, shades, to books and greeting cards? You might want to consider Facebook or Instagram ads. It is always wise to try out all the available resources before making a full blown investment. Advertise where your people go.

Be online:
Social media campaigns are useless if your social media presence is a bit of a damp squib. Go get the most of what there is. Hit and trial every move.

The best social media accounts always have advertisements reaches out to an audience in the most genuine way possible. You need to understand the art of blending the ad, as if the ad was a part of the timeline of the user themselves. Only then the bothering factor of advertisement can be concealed.
Make a note of it, your ads must break the ice, engage the customer and brand to have communication. You can't just throw up an ad on the internet and hope may be just may be someone would actually click on the ad.

Highly relevant ads:
Most of the ads we see on the internet are nothing but a 'call us, please' approach. All dressed up in what looks like high quality wording. However, social media advertisement has more to it.
Ask questions directly to the customer. For example, to a couple who just set their relationship status to "married" ' Are you looking for the perfection holiday location?', , immediately sets up a pain point in the mind of the ad viewer, and makes it easier for them to click on the ad.
We can't stress this enough.

"Make a note of it, your ads must break the ice, engage the customer and brand to have communication. You can't just throw up an ad on the internet and hope may be just may be someone would actually click on the ad."

You only get to choose a finite amount of space in social media advertising whether that be Facebook or Instagram, and truthfully it's not enough. However, using the most of what you have with an attractive picture and compelling piece of text speaks to the audience you are trying to reach.

IV



Electrical Vehicles in Nepal

How Nepal is going electric?

By Neliya Shakya

The 2015 Nepal blockade, which began on 23 September 2015, caused a serious economic and humanitarian crisis in the country majorly due to total foreign dependency on petroleum products. Nepal imports all of its petroleum supplies from India. Roughly 300 fuel trucks enter from India on a normal day which dwindled to a sporadic passage of 5–10 fuel trucks daily since the start of the crisis. The blockade choked imports of petroleum completely disrupting the transport industry.

This shed light into the need for an alternative solution and total fuel dependency for transport continues to be a problem even after the blockade has lifted. Many options of alternative energy are not feasible, for example, coal is too difficult to dig up and transport to give us the energy we need; nuclear fission is judged to be too dangerous; use of bio gas is also not very feasible.

However, Nepal possesses certain unique characteristics that favor Electrical Vehicles (EVs) expansion, particularly in Kathmandu. The first is the combination of Nepal's immense potential for hydropower generation and limited power utilization capability during off-peak hours and especially now that load shedding is a thing in the past. Battery operated EVs, in particular, could take full advantage of this and deliver substantial benefits to society at minimal additional cost. Nepal imports 100% of the gasoline and diesel fuel it needs and reduced dependency could result financial benefits. In addition, direct economic benefits can be accrued from electrical vehicles production and charging stations. A number of other benefits include employment generation and cross-sectorial advantages. Employment generation itself is significant. The use of electrical vehicles will also minimize air pollution.

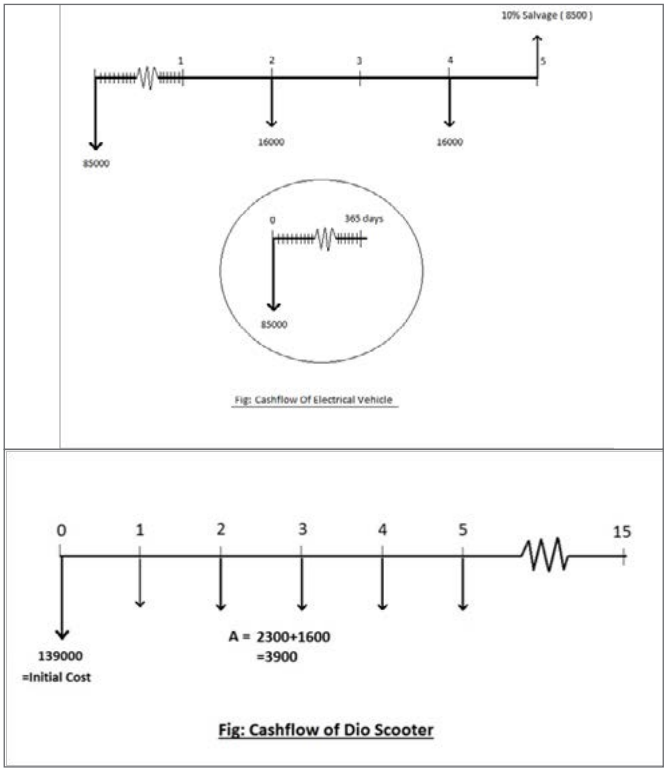


Fig: Cashflow of Dio Scooter

These various factors, coupled with the fact that Nepal actually has a functioning EV transit system in Kathmandu makes Electric Vehicles a preferable alternative to fuel operated vehicles. A brief research for our group project implores the possible scope for electric vehicles and their current status in Nepal.

Comparison between an electrical scooter and a petrol driven scooter

The daily equivalent costs of using an electrical scooter (E-Star) with a petrol driven scooter (Dio) is compared from collected data (*data may vary according to the model of the vehicle, dealer, operator/ user, etc*). The cash flow diagrams and calculations were concluded.

From the calculations, we found that the *Daily equivalent cost of using the electrical scooter = Rs. 82.21.*

Daily equivalent cost of using the petrol scooter =Rs.158.2.

Simple payback period of Safa Tempo

Simple payback period of Safa tempo= 18 months
Monthly income of Safa Tempo Entrepreneur =Rs.42, 840.

If the owner of tempo drives himself/herself they will save additional 11 thousand.

Total profit/month (if the owner drives themselves) = Rs.53,840

The calculations prove that electrical vehicles are more cost efficient than petro run vehicles. The payback period is less and the total profit/ month is high which makes it feasible for a country where unemployment is rampant.

Current Status:

The EVs currently in use in Nepal are 3-wheeled auto-



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rickshaws. Conventional ICE auto-rickshaws that seat 6 to 12 persons are hugely popular forms of public transport in South Asia. Hence, the Nepali experience with EV auto-rickshaws is of direct relevance to this region as a whole. Furthermore, the EV industry in Nepal is completely indigenous; with investments flowing almost entirely from local entrepreneurs and businessmen.

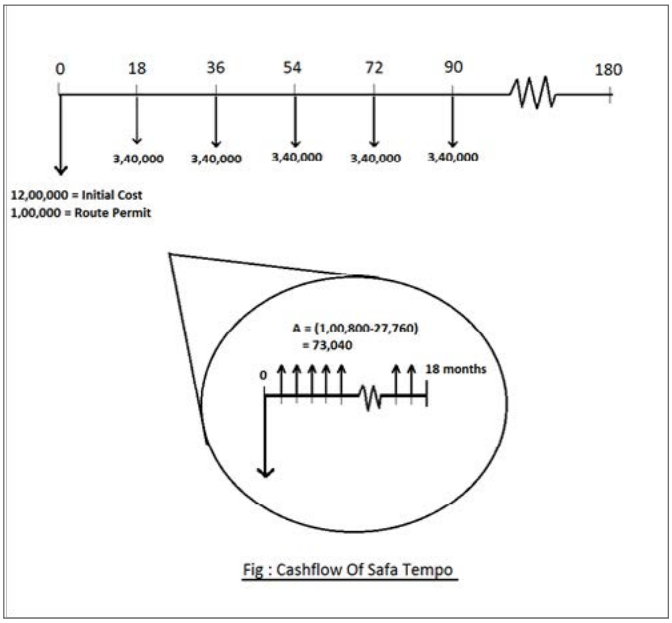


Fig : Cashflow Of Safa Tempo

The current market size in Nepal for electrical vehicles is relatively very small. Entrepreneurs are focused more in major cities of Nepal and hence there is lack of advertisement in other parts. Even inside the valley, people have very less idea in this topic. But due to the recent "unofficial" economic blockade by India, people are expanding their knowledge about electronic vehicles. They are more curious and willing to invest in electrical vehicles. However, currently electric cars are being used alongside fossil fuel cars and considered a second priority. Electric cars are usually used in case of fuel shortage and as refreshment as of current.

A lot of factors need prioritizing and improving for Electrical Vehicles to become a mainstream option for the majority of the motoring public. Some of the aspects are listed below:-

Subsidy and special provisions in buying electric vehicles:

Subsidy such as reduction in the tax in buying as well as yearly operating of the vehicle should be provided. Moreover, government should encourage private banks to provide loans on low interest and down payment while buying on installments can be reduced.

Establish refueling stations for electric vehicles:
Development of such refueling stations can increase the range of the operation of the electric vehicles, since the main concern about the electric vehicles is that they can be recharged only at home.

Importing better efficient electric vehicles:
Electric vehicles with improvement in battery life, use of automatic gears, product service life and the use of proper materials during manufacturing can be imported from other countries to have positive influence in the market.

Our research showed a number of policies that needed implementation for widening the scope of electric vehicles. The government's priority should be on promoting and diversifying low-cost, environmentally-friendly transport systems rather than undertaking ambitious mass-transit systems.

> "Nepal possesses certain unique characteristics that favor Electrical Vehicles (EVs) expansion, particularly in Kathmandu. And, a lot of lot of factors need prioritizing and improving for Electrical Vehicles to become a mainstream option for the majority of the motoring public."

Policy needed:
The Government of Nepal's policies regarding the EV sector have been inconsistent and management of facilities has been poor. Support is needed to study the feasibility of new approaches and to stimulate the participation of EV industry associations and public interest groups. If the following steps can be applied for policy making, there can be significant development of electrical vehicles in Nepal.

EVs for the Tourism Industry:
Electrical vehicles can be widely used in tourism areas like Pokhara, Lumbini, Chitwan,etc and should be encouraged by the government. Especially in the Terai Region as the roads are smoother and the operating time of these vehicles increases as a result of less power required for operation.

Technology and Business Promotion: New technologies should be encouraged like charging centers, fast charging systems, etc. for the development of electrical vehicles. New policies should be made in order to promote businesses of electrical vehicle existing in Nepal and also for further development of these types of businesses.

Value-added services:
Addition of features in electrical cars can increase the aesthetics and in turn the overall attractiveness of EVs. Some of them may be addition of a solar panel in a bike, availability of SIM card feature inside the car, backup battery, theft alerts, etc.

Promotion of driver owner concept in the operations of EV in the public transportation sector:
Policy regarding encouragement of owner driving concept that helps for self-employment should be made. Women empowerment will be encouraged if policy is made for helping them in driving Safa Tempo as well as other electrical vehicle.

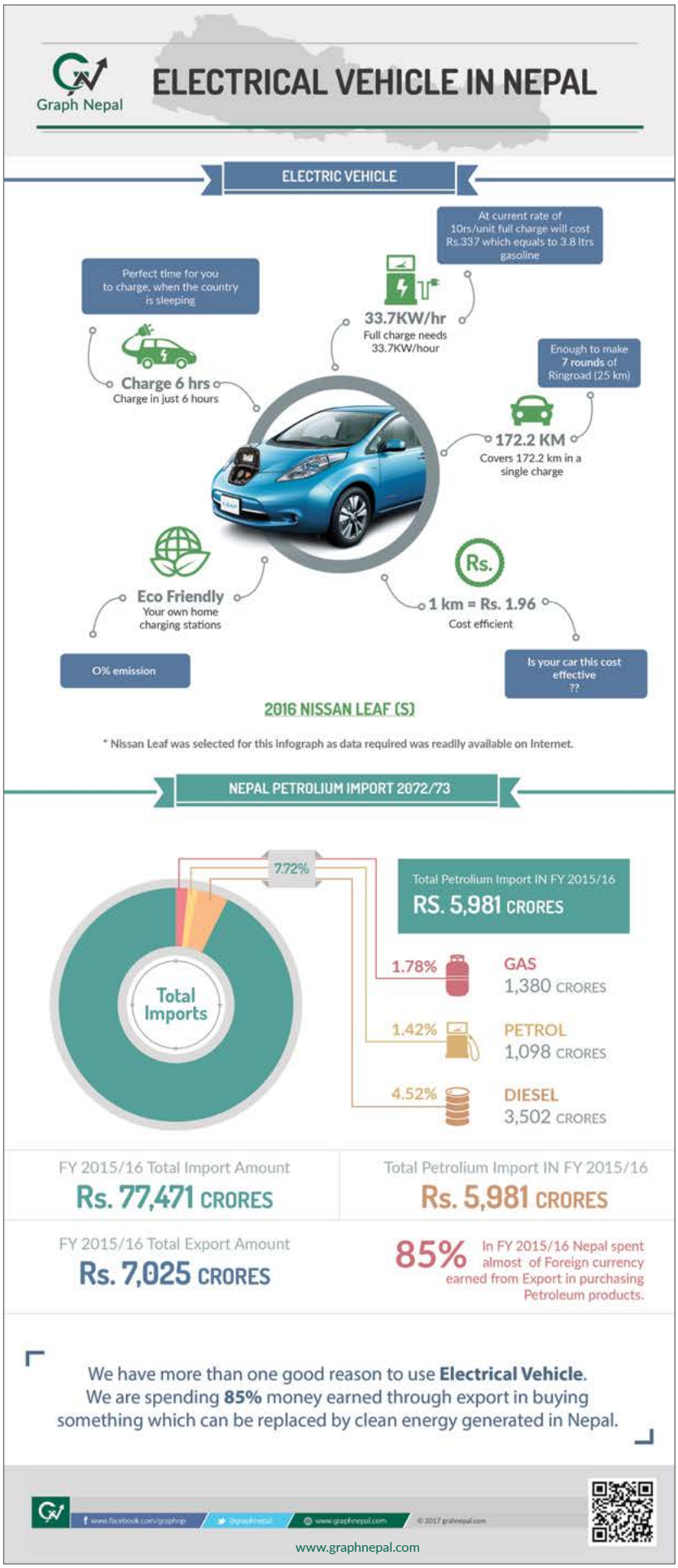
Policy regarding Hydro power in Nepal:
The country's Hydropower Development Plan should emphasize the use of electricity in the transport sector to reduce fossil fuel consumption and diversify the use of electricity and EVs.

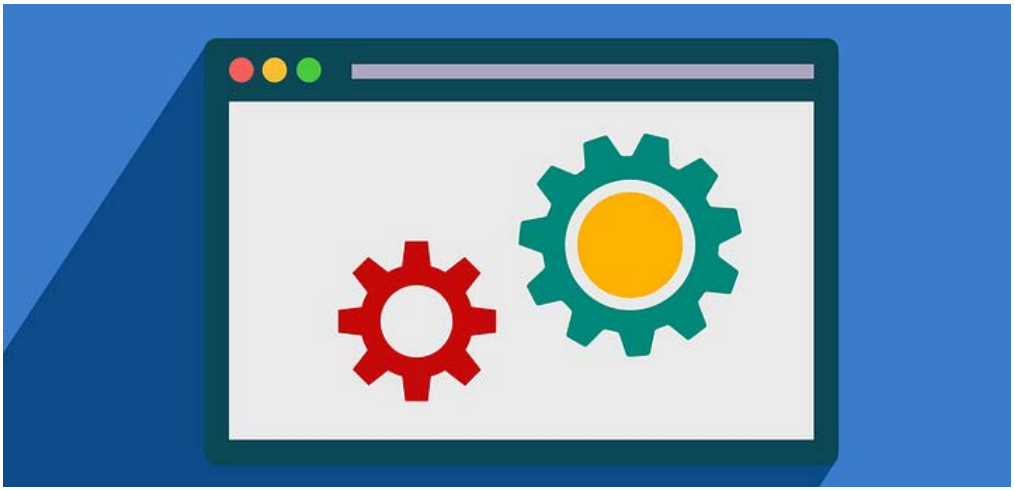
National policy and five year planning should focus on electrical vehicles:
National policy document should have the objective of promoting environment friendly industries, technologies with incentives and also adopt the policy of polluters should pay principle for reduction of use of fuel.

Long term Policy: Government needs to outline its long-term policy direction for EVs in order to provide the right incentives for early adopters as well as providing a stable policy environment for the EV market to develop over time. This policy needs to extend into strategies for the timely investment in the required infrastructure, the ownership of that infrastructure and the timescales over which it must be implemented so as not to delay the development of EVs and PHEVs as mass market solutions.

Policy for development of electrical vehicles:
Further research and development of EV batteries, energy management systems and fast charging is needed to maintain and increase the carbon advantage that EVs currently enjoy and to reduce costs of the battery and EV drive train relative to ICE vehicles. This needs to be achieved in parallel with continued decarbonisation of the Nepal electricity system. Also young entrepreneurs should be encouraged in the establishment of electrical vehicle manufacturing industries in Nepal.

EVs are cleaner, cost and energy efficient. However having tremendous potential, we are not able to translate it into practice in day to day life due to various constraints like political instability, high investment cost, short life span, etc. If we are able to promote and develop market of electrical vehicles they can soon be occupying a considerable percentage of transport industry in Nepal. IV





Strategic Approach for Improvement of Productivity

By Greejesh Prakash

Appropriate maintenance of plant equipment can significantly reduce the overall operating cost, while boosting the productivity of the plant. Although many management personnel often view plant maintenance as an outflow, a more positive approach in looking at it is to view maintenance works as a profit center. The key to this approach lies in a new perspective of proactive maintenance approach.

Revising the most expected ways that equipment will fail has been a key concern in reliability-centered maintenance (RCM) to safeguard that proactive, predictive and preventive maintenance actions during improvement could be planned and approved. So often that maintenance division will approve a more guarded approach of playing safe and relying on the conservative or usual method of equipment maintenance rather than vexing a proven method which has been tested to be competent just to evade any complicated matter ascending from the technique.

Henceforth, another outlook of looking at maintenance purpose is not only to maintain but also to augment the process or the plant process system as a result of reversal planning. Thus, rather than reinstating or trying to re-establish the equipment to its original performance, planning a reversal could better still aimed at enhancing the process and performance of a plant, equipment or any system.

In the maintenance enterprise state, presentation assurances and constant upgrading goals deliver better switch over maintenance outcomes and guarantee manufacture goals which are actuality stretched. Thus, another query ascends as to when we have to initiate our maintenance platform? The outdated method of capital engineering and scheme organizations is dignified on two key objectives – being on time and being on budget. Those dimensions inexorably drive the maintenance teams to focus on entire installed budget. Contradict to this, maintenance and dependability cluster focuses their energy on equipment that is up and running and their concern are more on the machine availability, reliability and avoiding down time.

> “An enhanced solution should be a combined and aligned method, which should initiate when the facility or system is just a proposal, which is even earlier the preparation stage, and lasts up until it is time to for the facility to de-commissioning.”

The assortment of precise equipment of low installed budget helps to decrease budget but at the same time drives up maintenance budget and downtime which is not promising to the vender maintenance team. Therefore, an enhanced solution should be a combined and aligned method, which should initiate when the facility or system is just a proposal, which is even earlier the preparation stage, and lasts up until it is time to for the facility to de-commissioning (Figure 1).
By dropping the direct and indirect cost of system failure, the perception of prolific, effective and cost-effective can be attained from the maintenance program.

Return of Assets = Revenue ---------- (1)
Asset Value
Revenue = Price × Volume ---------- (2)
Volume = Max. Capacity × Overall Equipment Effectiveness ----------(3)

Effective maintenance has a constructive result on calculation (1), (2) and (3).

Enhanced maintenance assists to improve efficiency by dropping the need for costly capital advancements to upturn output.

The goal of maintenance program is also changing and with the rapid technological development, improvement of equipment and technology will be one of the key aspects of improved maintenance practiced for better productivity, effectiveness and profitability. IV



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TOP TECH



SCio Food Scanner

SCio food scanner is a food sensor that helps get nutritional information, identify over the counter pain relievers ,me-saures and track body fat and body composition and gives you the information about the food you are going to con-sume with just touching or bringing the device near the food.

Livestream Movi

Live stream Movi captures the live moments in 4K Resolution and wirellesly connects to Iphones and uses coresponding apps and lets you edit upto 9 virtual cameras all on the fly.You can zoom pan cut and even follow faces with the help of this device.



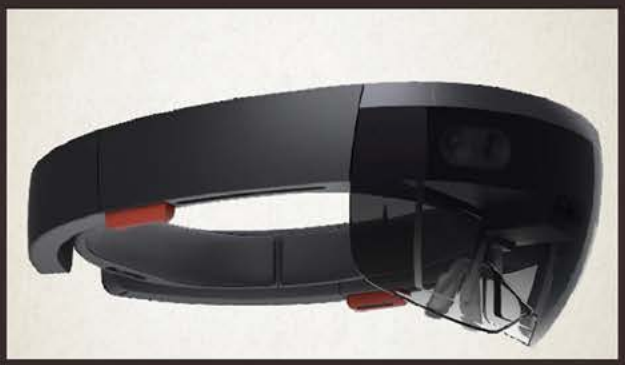


Ehang Passenger Drone

Ehang passenger drone is one of its kind which could carry a passenger into it and travel to navigated destination as if a fully automatic helicopter that could navigate itself to destination.

Google Hololens

In the field of visual simulation google has once again hit the bars with google`s Hololens.The hololens allows to work in 3D simulated enviornment from designing to gaming. Its speciality is it includes the real enviornment and simulate on that enviornment moreover like in ironman movies.





PlayStation VR

Always wanted to get hard inside the games and felt if i could do that with my hands then folks Playstation VR is the best choice for hardcore gamers .The Playstation VR enables the gamer to play in that virtual simulated enviornment generating realistic feelings.

TO WATCH



SanDisk 1TB SDXC card

An SD card has now broken the 1 terabyte threshold. SanDisk and its parent company Western Digital unveiled a new 1 terabyte SDXC card, accelrating in a new era of tiny memory cards with massive storage capacities.

GEST

Gest is a wearable devicethat allows you to control your mobile or computers withhands.Twist your finger to switch between apps,twist yourplam to to adjust slider in photoshop, rotate a 3D object with your bare hands.Gest helps you work with your hands in more intuitive way. Gest is versatile and can be programmed according to the need.





3D-PRINTING

Recent advances make it possible to mix multiple materials together with traditional 3D printing in one build. This could be useful for field operations or repairs when a specific tool is required and printed on demand. Biological 3D printing — such as the printing of skin and organs — is progressing from theory to reality.

SELF-DRIVING CARS

The year 2016 was the development of driverless cars shifted into high gear. Tesla pledged to include an enhanced, completely self-driving Autopilot in all models, and Uber was the first ride-sharing company to put driverless cars on the road. Imagine if everyone could get around easily and safely, without tired, drunk or distracted driving. Time spent commuting could be time spent doing what you want to do.





NEW BATTERY TECH

Future batteries, coming soon: Charge in seconds, last months and power over the air !!

A team of engineers led by 94-year-old John Goodenough, professor in the Cockrell School of Engineering at The University of Texas at Austin and co-inventor of the lithium-ion battery, has developed the first all-solid-state battery cells that could lead to safer, faster-charging, longer-lasting rechargeable batteries for handheld mobile devices, electric cars and stationary energy storage.



Virtual Reality

Bringing efficiencies to education, business, healthcare, and industries

By Asmita Acharya

Virtual reality (VR) refers to computer technology that use software to generate the realistic images, sounds and other sensations that replicate a real environment and simulate a user's physical presence in this environment. VR has been defined as "a realistic and immersive simulation of a three-dimensional environment, created using software and hardware and experienced or controlled by the moment of the body" or as an "immersive, interactive experience generated by a computer".

Simply, Virtual Reality is the 3-D image that can be explored interactively at a personal computer, usually by manipulating keys or the mouse so that the content of the image moves in some direction or zoom in or out. More sophisticated efforts involve such approaches as wrap-around display screens, actual rooms augmented with wearable computers, and haptic devices that let you feel the display images. Scientists, theorists, and engineers have designed dozens of devices and applications to achieve this goal. Opinions differ on what exactly constitutes a true VR experience, but in general, it should include:

- Three-dimensional images that appear to be life-sized from the perspective of the user.
- The ability to track a user's motions, particularly his head and eye moments and correspondingly adjust the images on the user's display to reflect the change in perspective.

A VR environment should provide the appropriate responses in real time as the person explores their surroundings.

> "Virtual Reality is the milestone for upcoming technologies."

The problems arise when there is a delay between the person's actions and system response or lately which then disrupts their experience. The person becomes aware that they are in an artificial environment and adjusts their behavior accordingly which results in a stilted, mechanical form of interaction. The aim of VR is a natural, free-flowing form of interaction which will result in a memorable experience.

VR may seem like a lot of efforts and it is what makes the development of VR worthwhile? The potential entertainment value is clear immersive films and video games are good examples. The entertainment industry is after all a multiple-billion virtual reality has many other, more serious, applications as well. There is a wide variety of application of virtual reality which includes architecture, sport, medicine, art, and entertainment. Virtual reality can lead to new and exciting discoveries in these areas which impact upon our day to day life.

Wherever it is too dangerous, expensive or impractical to do something, in reality, virtual reality is the answer. From trainee fighter pilots to medical applications trainee surgeons, virtual reality allows us to take virtual risks in order to gain real world experience. As the cost of virtual reality goes down and it becomes more mainstream then you can expect more serious uses such as education or productivity applications, to come to the fore. Virtual reality and augmented reality could substantively change the way we interface with all digital technologies. Continuing the trend of humanizing our technology,

Virtual reality isn't just a view master for your video



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games. It's an entirely new medium whose true purpose is slowly being realized. Today manufacturing industries are trying to improve their competitiveness by combining manufacturing percent with information technology. Virtual reality is being used in product development processes in manufacturing enterprise as helpful technology to achieve rapid consolidation of information and decision making through visualization and experience.

Here are a few ways VR will be used over the next few years.

Entertainment:
From films made by Hollywood to live-streamed concerts and theatrical experiences, VR has become a place to view videos that surround you. New cameras are being created to capture these VR stories, and tools to upload and live stream them are growing in number. Megadeth and Universal Music were looking for creative way to view album sales for Megadeth's 15th studio album, Dystopia. With the growth in digital downloads and media have declined. Universal music and Megadeth also wanted to stay innovative, to increase album sales, to engage fans then EON Reality teamed up with CEEK VR, Inc and Universal Music group to release Megadeth Dystopia VR Experience a takeover of CEEK VR, the next generation social VR platform. Megadeth's Dystopia VR Experience includes five performances filmed in 360-degree video, an interview with the band, a produced 360-degree music video and a virtual Reality fans to interact with each other. Then EON Reality and CEEK VR have created a completely immersive experience by the band, for the fans that give users a chance to experience the band for the fans that unlike anything they have seen before. The project proved to be a hit with the fans. The deluxe album sold out in the first week and subsequent runs of the deluxe version have had strong sales. In this way, VR helps in the industrial field.
Simulation:



Medicine, chemistry, physics, and astronomy: VR can model the world in an incredibly visual way. And it can also allow those worlds to be expanded and shrunk, played with and entered. Students could take a class trip to ancient Egypt, or try an open-heart surgery without any risks: VR simulations can offer practice runs at techniques, designs, and ideas.

Medical Training for Ophthalmology:
Medical students studying ophthalmology view the complex structures and functions of the human eye through two-dimensional teaching aids and traditional teaching methods. Deliberate practice is necessary for mastery learning. Currently, this takes place through physical simulators purpose built for specific procedures. However, how do these students master the basic concepts on which these simulators are based? In order for complex concepts of ophthalmology to be mastered, there needs to be innovative in the ways student learn.

EyeSim developed together with Dr. Anuradha Khanna (MD, Associate Professor of Ophthalmology, Loyola University)
From a Nu Reality, is a Virtual Reality ophthalmic training simulator application designed for educators to use in the classroom for to achieve mastery learning through deliberate practice. Currently available modules include ocular anatomy, pupil simulator, ocular motility simulator and a visual pathway simulator. In this way, virtual reality presents then the perfect platform for advanced medical education. With VR, students can get hands-on practice to help them master complex and difficult tasks. EyeSim is available on Mobile platforms, Desktop, Ibench Mobile and Icatcher also.

Psychology and Meditation:
VR can become a private space for your mind a place to relax and think or it can be a place to explore something uncomfortable in protective simulations. Virtual worlds can be very removed from the real world or be labs to explore human behavior. Studies have shown that VR is so distracting, it can be surprisingly effective painkiller compared with traditional medicine.

Tourism and Exploration:
Virtual tourism is the next best thing to being there. You could visit Paris, Moon or the bottom of the ocean. Whether you are watching a 360-degree video someone shot or a computationally generated 3D simulation, you can shut out the real world and replace it with your destination of choice. One day, you may be able to explore your own memories as well imagine recording them with a 360-degree camera, then looking around to see what you missed at the moment.

To improve attendance, to share culture and hard to preserve, EON Reality and Virtualiter Inc., a leading company in luxury locations and exhibition, together released a virtual reality tour of the Magi Chapel. Users are able to explore the chapel in a full 360 degrees and examine every detail. By looking at each fresco, the viewer is able to explore each fresco and hear a detailed explanation. This pilot application is a part of virtual reality which seeks to preserve and protect cultural treasures from around the world. In this way, students are now able to experience Magi Chapel in a way that otherwise would be impossible.

Gaming:
Obviously, video games are one of the main applications for virtual reality as of today. But VR will give game designers the freedom to take games to incredible new places. They can also find new audiences now that players can just reach out and touch things and turn their head to look, instead of mastering a complex controller covered with joysticks and buttons.
In this way, virtual reality can be used in waste management in Anatomy simulation, aviation maintenance, soccer experience, Disaster preparedness, and so on.

Virtual Disaster Preparedness:
Singapore regularly sees devastating natural disasters such as typhoon, earthquake, tsunami and fire. For the people of Singapore there is no stopping Mother Nature, all that can be done is to be the most prepared as possible

for these emergencies. Being prepared may not stop all incidents from happening but it allows responders to quickly and effectively react to emergencies and better manage the consequences. The challenges building awareness so that people understand the risks and danger these disasters pose.

EON Reality was selected by the Singapore Civil Defense Force (SCDF) to promote emergency preparedness through the use of immersive Virtual Reality technology. The EON Icube solution has also been integrated with 4D effects such as the wind to further strengthen the visitor's experience.

It is only a matter of time until another natural disaster strikes, but through the disaster simulator, the citizens will be better prepared because they were able to experience the effects of different emergency scenarios while in a safe environment. The VR environment allows for users to learn faster, remember longer and decide quicker than reading a traditional safety pamphlet. As mentioned above, being prepared may not stop all incidents from happening, but it allows the citizen to quickly and effectively react to emergencies and better manage the consequences. Many companies, including Go Pro, Nokia, Samsung, Richo and Nikon, develop omnidirectional cameras, also known as 360-degree cameras or VR cameras, that have the ability to record in all direction. Non-profit organizations such as Amnesty International, UNICEF and World Wide Fund for Nature (WWF) have started using virtual reality to bring potential supporters closer to their work, effectively bringing distant social, political and environmental issues and projects to members of the public in immersive ways not possible with traditional media. Panoramic 360 views of conflict in Syria and face to face encounters with CGI tigers in Nepal have been used in experimental activations and shared online to both educate and gain financial support for such charitable work.

> "Today manufacturing industries are trying to improve their competitiveness by combining manufacturing percent with information technology. Virtual reality is being used in product development processes in manufacturing enterprise as helpful technology to achieve rapid consolidation of information and decision making through visualization and experience."

Virtual reality is the creation of a virtual environment presented to our senses in such a way that we experience it as if we were really there. It uses a host of technologies to achieve this goal and is a technically complex feat that has to account for our perception and cognition. It has both entertainment and serious uses. The technology is becoming cheaper and more widespread. We can expect to see many more innovative uses for the technology in the future and perhaps a fundamental way in which we communicate and work thanks to the possibilities of virtual reality. So, VR is the milestone for upcoming technologies. IV

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५० वर्ष ढुक्क

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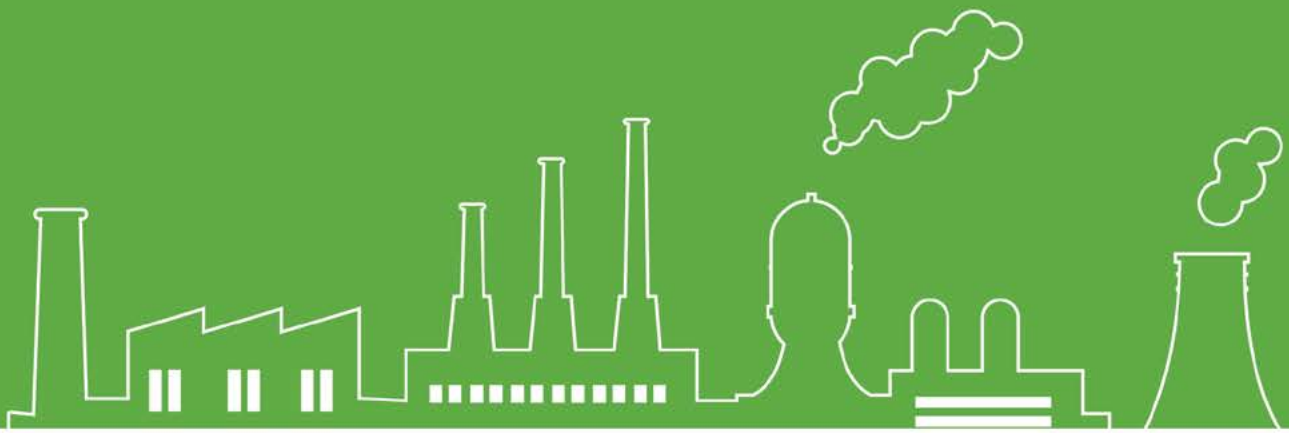
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What is Your Product?

The Way Forward

By Umesh Lakhey

What is your Product?
The world is growing smaller and so is a person's day. The modern life is getting so much complex that rarely anyone has enough time for others and at times not even for oneself as well. There is no remedy to time and situation as they wait for no one.

One day I woke up real late and had to immediately rush myself to work. It was bad enough that the busy and chaotic day had already started for me. Tying my tie knot had to be doneon the way and the early morning nature call had to wait until I reached my office. The office hour had already started and I was damn hungry,making me unable to concentrate on anything. I started wondering what could I eat that would hold me at least till my mid-day break?

Shall I bring in some biscuits and have it with a cup of tea? That might be fast as well as cheap enough but not good enough to hold me till my day break. Shall I order a lunch set from on-demand online delivery websites? That might be good enough to hold me till my break and cheap as well but it may take a long time to get delivered. Or shall I order from the same online platform giving them very little time for delivery? But then I might end up with paying very high delivery charge. That's when I realised: this is the limitation that every customer is facing when trying to choose among different alternatives they come across.

Whenever we have to decide for any product or service, mainly three things come in between our buying behaviour - quality, price and timeliness. As a consumer we would obviously try for acquisition of all these three attributes. Customer satisfaction may be at the state of delight when they experience a high quality product or service, bearing very low cost,witheasy access to product or incur less waiting time for service. But a consumer who expects experiencing all of these at the same time can be a very rare case. They must be willing to sacrifice any one of them for the sake of others two.

Where does your product lie?
As a business owner, whether you are involved in any rocket science or in any simple logistics handling, your product or service will ultimately suffer from any one of these limitations. In the long run, trying to achieve all three of them would be like shooting the moon. Your product will always be limited by one way or the other.

> "We cannot neglect the fact of your product being limited to any two of them. But at the same time you can choose any one of them to be your unique selling point."

Design your product carefully
"We offer three kinds of service: Good – Cheap – Fast. You can pick any two"
While designing your product or service, you must prepare yourself well and be careful enough. You must derive the attributes to your product in such a way that your customers will be able to derive most out of it. Your deliverables must be specific and of high utility to yourcustomers. So at this point of time, you can turn the limitations of time, cost or quality to be your advantage as well. We cannot neglect the fact of your product being limited to any two of them. But at the same time you can choose any one of them to be your unique selling point. Choice is yours!!! IV



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Data Analyst at Grow By Data and can be reached at umeshlakhey@gmail.com.



Get Noticed On LinkedIn

A Data Approach for Job Search and Career Standout

By Karthik Rajan

"How many times do you go to the second page of Google Search?" I asked a group of college students gathered to explore ways to stand out on LinkedIn. Few raised their hands.

Google search has changed the face of marketing. Data and technical wizardry stand shoulder to shoulder with advertising and branding - a game changer for many introverted folks.
What happens, if we extend it to LinkedIn People Search? Any data insights can we gather? Would there be an interest?
I posed a follow-up question to the students, "Google is a default on information search, LinkedIn is growing into that for the professional side of people search. Would you be interested in knowing some ways to increase your odds on being closer to the first page on LinkedIn Search?" This time all hands went up.
Framing the LinkedIn Search Question and Synthesis of Insights

All else equal, ceteris paribus, what could be a difference that could make your profile show-up ahead when a recruiter searches within LinkedIn?
For the busy few, who want the (quantitative) punchline(s) to enhance your profile visibility during a LinkedIn Search. (Details later)
1. Join as many groups (Max on LinkedIn is 100)
2. Add many general skills (Max on LinkedIn is 50)
3. Have >50 connections
4. This is not part of the search, but a criteria, (many) recruiters use: If you are early in your career, increase the number of recommendations you gather.
If you are the curious kind like me (I like to know why I assume you do as well), here are the details:

1. What has joining groups got to do with profile search, statistically?

First degree connections (direct connections) come ahead of 2nd-degree connections which are ahead of 3rd-degree connections.
All this makes sense with one small nuance. If you are 3rd-degree connection which most of the world is for all of us, those you share a group come ahead of the rest!

> "Would you be interested in knowing some ways to increase your odds on being closer to the first page on LinkedIn Search?" This time all hands went up.

2. General Skills
LinkedIn has a way to search by skill especially for recruiters. Why do you want to miss out? For this one, your listing is more important than endorsement – prioritizing within priority. In the early part of my career, I had worked in the agro-chemical industry. I had someone reach out to me based on this criterion, a few years ago. My takeaway – having keywords that are rarely used in the world but more unique to your profile is similar to some of successful Google search engine optimization approaches. Keep the generic ones to the standard skill sets that LinkedIn offers.
3. >50 connections are needed for 'LinkedIn All-Star' status to show up in search results. Other criteria are here at this link

4. Count of Recommendations:
I recently learned this nuance. I am a big believer in "less is more." I would rather have a narrative through few recommendations than many that the reader need to filter out.
I am not a recruiter. I came to know about 'count' as criteria by recruiters. I spoke to a few to ratify. They look at it as the number of people willing to endorse your brand – it takes more time and commitment to writing a recommendation than clicking on the skill. Stated that way, I can see where they are coming from.
Caveat: Being aligned to the original question, I have shared the quantitative side to give your profile an edge during LinkedIn Search as I did not find discussions online. This is only half the equation. To stand out, the qualitative side matters –plethora of sources on the web and even within LinkedIn Pulse can be found. Make sure you check them out.
A toast to your success bringing your professional identity to life online and hope you found the numbers side of LinkedIn search interesting and useful. IV



Karthik Rajan is a data geek with social skills. He can be reached at karrajan01@gmail.com.

Can Automation Solve Transportation Problems?

The Mahendra Highway is 1,027 kilometres in length, running across the entire width of Nepal. The condition of the road varies in places, from well-maintained to potholed and hilly, meaning that drivers regularly come up against long delays and road closures. Here, Jonathan Wilkins, marketing director of obsolete industrial parts supplier EU Automation, discusses the potential benefits of automation for transport in developing countries.

Unfortunately, the Mahendra Highway is no exception. Developing countries, such as Nepal, Mexico and Nigeria have always struggled with transportation. In recent years, however, personal vehicles are becoming more affordable for the entire population, meaning that there are more cars on the road in these countries than ever before. The amount of vehicles on the road is likely to continue increasing, but which recent developments in automation help solve the problem?

Transport systems and infrastructure

According to a recent report published by the International Association of Public Transport, as of July 2016, there were 53 fully automated metro lines in 36 cities across the world. Of the current 786 km of these automated lines, half sit in four countries: France, South Korea, Singapore and the United Arab Emirates. It is predicted that by 2023 there will be 2,200 km of automated lines in the world.

Automated transport systems are already up and running in some of the world's most populated countries. However, it's important to remember that smaller, developing countries are home to around a quarter of the world population, making this market crucial in achieving progress towards more automated urban development.

The size of countries such as Nepal allows for flexibility in terms of urban expansion, adoption of automated modes of transport and environmental protection. At the same time, developing countries usually have fewer resources to implement new transport measures and can be more vulnerable to fluctuations in the world's economy.

Although developing countries are often at a disadvantage when applying new technologies in the transport sector, there are some benefits. Constructing transport and communications infrastructure at the same time is much easier than retrofitting one of them. Developing countries are generally not burdened with outdated IT infrastructure. They can take advantage of having a lack of technology by deploying up-to-date systems that have already been tested and used in developed regions. One technology that has the potential to address urban transport problems in developing countries comes in the form of intelligent transportation systems (ITS). In East Asia, Eastern Europe and Latin America, the most common forms of ITS include traffic signal systems, traffic surveillance using CCTV and commercial vehicle tracking. Despite its benefits, ITS is still being deployed at a slow rate in developing countries. Further ITS deployment is needed in these settings to improve road safety conditions and mitigate traffic congestion that stems from poor road conditions.

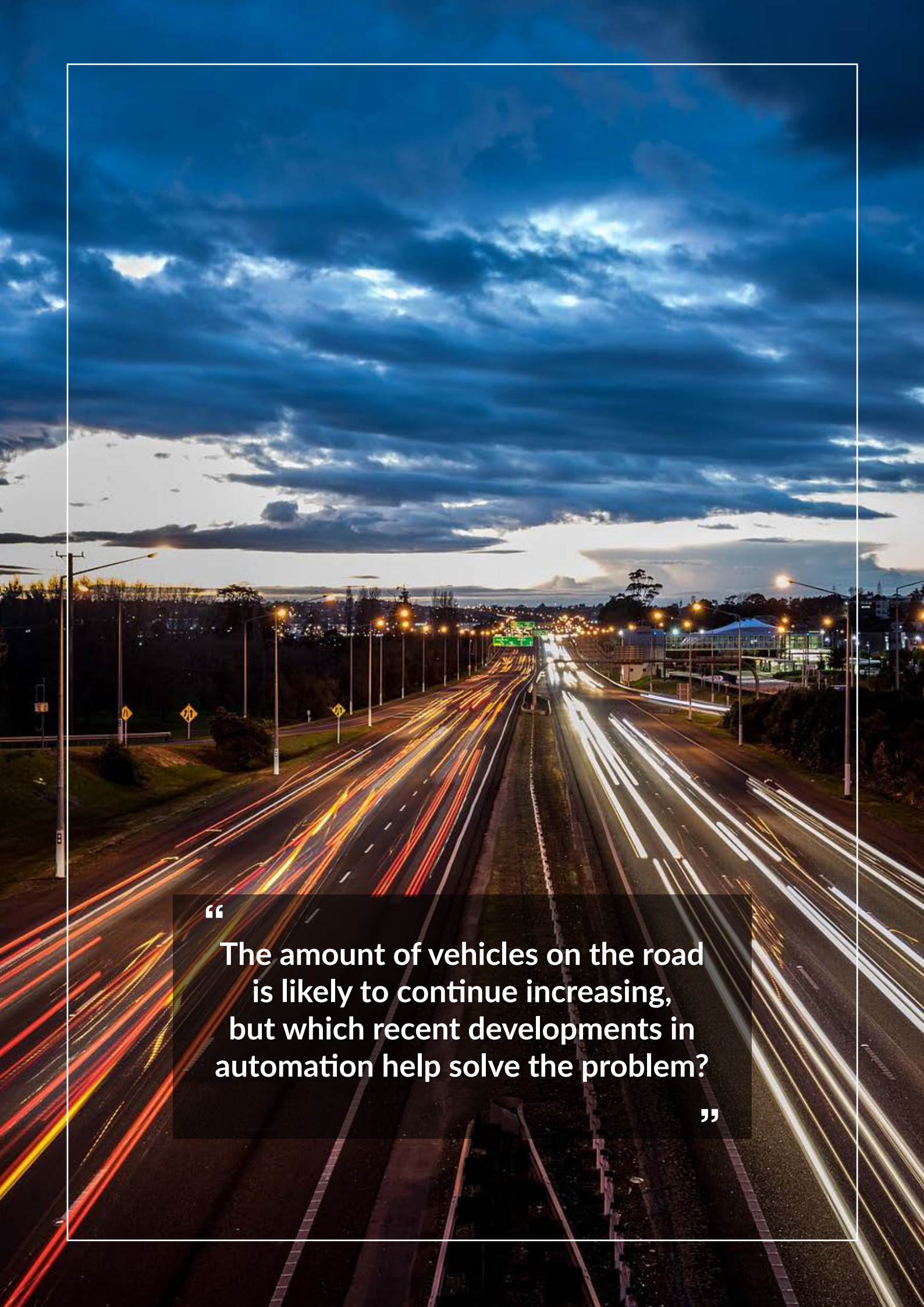
Automated public transport

The conversion from a conventional metro system to an automated one is a complex project that may require carefully considered timing and signalling upgrades, fleet modification and retrofitting of track protection systems. Despite this, the benefits of automated metro trains have been seen in the safety, reliability and flexibility they offer passengers, so it is expected that the current exponential growth phase will continue.

Despite rising demand for public transport in Nepal, there are very few public transport operating systems established in the country, let alone automated ones. However, as the technology is already tested and implemented in many developed countries, smaller regions such as Nepal, have the opportunity to bypass the standard public transport systems and implement the automated technology



Jonathan Wilkins is the Director at European Automation, Stafford, England. He can be reached at jonathan.wilkins@euautomation.com


“
The amount of vehicles on the road is likely to continue increasing, but which recent developments in automation help solve the problem?
”



available today.
There are varying degrees of metro automation. Some systems are capable of running station to station without any control from the driver, who functions only to detect obstacles and open and close the doors. The highest level of automation, a truly driverless metro vehicle, is already functioning in Copenhagen and Barcelona. Paris finished the conversion of Metro Ligne 1 to operate using driverless trains in December 2012 after years of planning, construction and negotiation with unions. The conversion was done without major interruption to passengers and its success led to the automation of several other lines in the system.

The new automated system has allowed trains to carry additional passengers at peak times and enabled trains to run every 85 seconds. Sceptics believe this is partly to do with the wide, well lit, proximity of Paris's metro stations, as well as the abundance of security staff on the platforms, which is difficult to replicate in other metropolitan areas.

For an automated metro system to be safe, the platform-track interface is an important factor. One solution for this is to add platform door screens to prevent any individual from having contact with the track, similar to those that exist in Paris today. Another less popular option is a track intruder detection system. As a whole, limiting access to the track altogether is seen as a more viable solution.

The most popular signalling system used is communications-based metro control, which means the exact positioning of the train is monitored and regulated at all times. This information is used to increase efficiency and capacity by safely reducing the headway between trains on the same line. The train's location is determined using track and on-board data that is wirelessly transmitted to a central control facility, which manages all trains in the system. Central control means that service can be adjusted quickly to respond to delays or accommodate crowds and to allow for real-time information.

Safety and environmental concerns
In 2016, air pollution became so big a problem in New Delhi that the Indian capital came up with a programme which forced drivers off the road. For the first two weeks of 2016, private cars with even-numbered licence plates were allowed on the roads on only even-numbered days and those with odd-numbered plates on odd dates.

The restrictions noticeably reduced traffic, but caused inconvenience for commuters. New Delhi described the two-week trial as an emergency intervention, but there is still no permanent solution in place.

In Europe, exhaust pollutants from road transport are a fraction of what they were two decades ago. Engine efficiency improvements and exhaust after-treatment systems have brought huge reductions in carbon monoxide, hydrocarbons, nitrogen oxides, particulate matter and ultra-fine particles from cars, vans and heavy commercial vehicles.

Modern road vehicles with diesel engines use highly efficient particle filters that remove over 99 per cent of particles formed in the combustion process, resulting in exhaust content that is comparable to ambient air.

The number of deaths due to road incidents in India is around three to four times that of European countries including France, Germany and Spain. As a result, Indian automotive safety standards have been criticised as being insufficient. India is the only country among the global top ten car markets without a testing programme that measures the safety of vehicles. As many of these vehicles are exported to surrounding developing countries, the problem is likely to spread.

The Bharat New Vehicle Safety Assessment Programme (BNVSAP) is a new car assessment programme for the Indian automotive industry. It was expected to be implemented in 2014, but has since been pushed back to 2017, due to delays in setting up laboratories and other facilities. Within two years of implementation, new cars sold in India will need to comply with voluntary star ratings based on the vehicle's performance in crash tests.

Critical safety features such as airbags, anti-lock braking systems (ABS) and seat belt reminders will become standard in all cars manufactured in the country and offset front crash, side and rear impact tests will be required.

We are already starting to see a strong interest in automated transport from developing countries and, as their successes start to show in neighbouring areas, we can expect to see a number of similar projects emerging in unlikely locations. IV



> We are already starting to see a strong interest in automated transport from developing countries and, as their successes start to show in neighbouring areas, we can expect to see a number of similar projects emerging in unlikely locations.



e-Payment Services in Kathmandu City

Using Technology Acceptance Model

By Sushant Raj Giri

What are the factors that affect the adoption of e-Payment services?

How much these factors affect people's intention towards the adoption of e payment services?

Growing use of the internet for business transaction has had a profound effect on every industry with the advances in information and communication technologies. While this is a global phenomenon, creating a truly global marketplace, penetration of e-Payment services into less developed countries still lags behind that of the developed Western countries. Poor economies, education and infrastructure are obvious factors in the slow adoption in some developing countries, but certainother issues like Trust also plays a major role.

e-Payment in Nepal

The acceptance of e-Payment is an emerging topic in Nepal as well. Nepal is a small economy of which the banking era has not yet completed a century.Presently, there are 23 commercial banks, 36 development banks and 91 finance companies. However, e-Payment has still not gained popularity.

Payment for goods and services in Nepal is characterized by long queues; long distance traveling and time wasting that generally affect business activities and ultimately economic development. Settling utility bills, payment for goods and services, and money transfers has been a major headache for individual and firms in Nepal resulting in declined business activities and huge debt to most of the utility providers. In fact, the country have not yet realize the full benefits of the technological advances in electronic payment such as the use of cards, automated teller machines (ATM), the Internet, mobile phones, and etc.

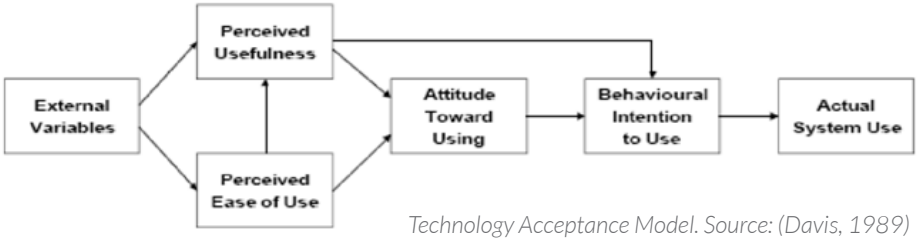
Only a few payment solutions have been introduced so far in Nepal.

The forms of e-payment in Nepal include:

- Credit Cards (introduced by Nabil Bank in 1990)
- Debit Cards (all commercial banks)
- Automated teller machines (introduced by Himalayan Bank Ltd. in 1995)
- Electronic fund transfer at points of sale (EFTPOS)
- Internet banking (introduced by Kumari Bank Ltd. in 2002)
- Mobile banking; (introduced by Laxmi Bank Ltd. in 2004). (Mishra, 2008)

However, cash still remains the most popular retail payment instrument, despite the introduction of electronic payment schemes in the country.

The need to understand what the factors are influencing the adoption of e-Payment is important for managers, providers and researchers. The spatial and temporal separation of e-commerce between customers and vendors as well as the unpredictability of the Internet infrastructure generate an implicit uncertainty around the initial adoption of on-line service (Pavlou, 2001). Accordingly, the initial adoption of e-service like e-Payment, basically involves the acceptance of both the Internet technology and on-line service providers.



Technology Acceptance Model. Source: (Davis, 1989)



Er. Sushant Raj Giri is an industrial engineer and he can be reached at sushant.r.giri@gmail.com.

Definition of constructs

Constructs	Definition
Attitude	The person positive or negative fleeing about e-Payment services adoption
Subjective Norms	Represent the degree to which a person perceives that important others believe he or she should use e-Payment services
Perceived Behavioural Control (Self-Efficacy)	The degree to which a person's self-confidence in her/his ability to use e-Payment services.
Perceived Usefulness	The degree to which a person believes that using e-Payment services would enhance her/his job performance
Perceived Ease of Use	The degree to which a person believes that using e-Payment services would be free of effort
Trust	Trust refers to the belief that the promise of another can be relied upon and that, in unforeseen circumstances, the other will act in a spirit of goodwill and in a benign fashion toward the service provider.
Intention	A person readiness to adopt e-Payment services

Use of Technology Acceptance Model

Theory of planned behaviour (TPB) is the model widely used in predicting and explaining human behaviour while also considering the roles of individual organizational members and social system in this process. Accordingly, the three influencers in this theory, i.e. attitude, subjective norm and perceived behavioural control, can be interpreted as attitude for technology role, subjective norm for organizational members and social system roles, and perceived behavioural control for individual role.

As e-Payment is considered as a type of innovative technology, organizational and social systems such as peer or superior influence and self-efficacy in computer or external resource constraint should play the important role in determining the acceptance of e-Payment.
From the practical perspective decision makers in this sector want information about how their customers act and react. Consumer acceptance models are valuable to managers as they help the to organize their learning about consumers and their behaviours, service providers are able to acquire a better understanding and build a stronger relationship with them. Technology Acceptance Model (TAM), introduced by (Davis, 1989), is an adaptation of the Theory of Reasoned Action (TRA) specifically tailored for modelling user acceptance of information systems.

Hence an extension of Trust and TAM model with TPB including subjective norm and perceived behavioural control should be in a more comprehensive manner to examine the acceptance of e-Payment.
A quantitative research conducted using Technology Acceptance model was conducted with sample of about 142 respondents in Kathmandu to analyse the cause of low usage of e-payment.In the course of analysis, descriptive statistics, correlation statistics, multiple regression statistics, multi collinearity, and goodness of fit test was used.

Research Hypothesis:

The research hypothesis that this research was based on are as follows:
Ho1: Attitude has no positive impact on intention to use e-Payment.

Ho2: Perceived behaviour control has no positive influences intention to use E-Payment.

Ho3: Subjective norm has no positive effect on intention to use E-Payment.

Ho4: Trust has no positive effect on attitude to use E-Payment.

Ho5: Trust has no positive impact on perceived behaviour control to use E-Payment.

Ho6: Trust does not positively influences subjective norm to E-Payment.

Ho7: Trust has no positive effect on intention to use E-Payment.

Ho8: Trust has no positive effect on PU to use E-Payment.

Ho9: PEOU has no positive impact on PU to use E-Payment.

Ho10: PEOU does not positively influences trust in using E-Payment.
Ho11: PEOU does not positively influences attitude to use E-Payment.

Correlations

Constructs	Intention	Attitude	Perceived Behavioural Control	Trust	Perceived Usefulness	Perceived Ease of Use	Subjective Norms
Intention	1	.657**	.541**	.458**	.590**	.618**	.081
Attitude		1	.503**	.486**	.584**	.468**	.132+
Perceived Behavioural Control			1	.268**	.269**	.410**	.210*
Trust				1	.332**	.498**	.379**
Perceived Usefulness					1	.604**	.159+
Perceived Ease of Use						1	.194*
Subjective Norms							1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

+. Correlation not significant as the constructs have no relationship

Ho12: PU has no positive impact on attitude to use E-Payment.

Ho13: PU has no positive effect on intention to use E-Payment.

Correlation Analysis:

Correlation analysis is done to assess the impact that movements or variations in perceived ease of use, perceived usefulness could have on e-Payment use.

Regression Model

The following table represents the result of testing the structural links of research model using linear regression analysis. The estimated path coefficients are given along with the associated t-value. Most of the coefficients are significant at the 99% significance level providing strong support for all the hypothesized relationships.

Hypothesis (Hoi)	Effects	R2	Constant (ß0)	Coefficient (ßi)	t-stat	Remarks
Ho1	ATT -> INT	0.431	0.076	0.657	10.305	Reject
Ho2	PBC -> INT	0.293	1.627	0.315	7.616	Reject
Ho3	SN -> INT	0.007	3.895	0.081	0.958	Accept
Ho4	Trust -> ATT	0.236	3.509	0.486	6.581	Reject
Ho5	Trust -> PBC	0.072	3.564	0.268	3.286	Reject
Ho6	Trust -> SN	0.144	2.624	0.379	4.849	Reject
Ho7	Trust -> INT	0.210	2.897	0.458	6.098	Reject
Ho8	Trust -> PU	0.110	3.759	0.332	4.163	Reject
Ho9	PEU -> PU	0.365	2.775	0.604	8.978	Reject
Ho10	PEU -> Trust	0.248	1.289	0.498	6.795	Reject
Ho11	PEU -> ATT	0.219	3.269	0.468	6.260	Reject
Ho12	PU -> ATT	0.341	2.081	0.584	8.509	Reject
Ho13	PU -> INT	0.348	0.796	0.590	8.643	Reject

The results shows that the intention to use e- payment is predicted by Attitude (ß1= 0.657, p<0.01), Perceived Behavioural Control (ß2= 0.315, p<0.01) Trust (ß7= 0.213, p<0.01) and Perceived Usefulness (ß13= 0.328, p<0.01). Attitude is predicted by Trust (ß4= 0.318, p<0.01), and Perceived Usefulness (ß12= 0.459, p<0.01). Perceived Usefulness is predicted by Perceived Ease of Use (ß9= 0.584, p<0.01).Trust is predicted by Perceived Ease of Use (ß10= 0.498, p<0.01).Trust has positive effect on Perceived Behavioural Control (ß5= 0.268, p<0.01), Subjective Norms (ß6= 0.379, p<0.01)

Conclusion:

The study put forwarded the following conclusions:

Explaining Intention

Attitude (ß1= 0.657) has significant effect on intention and there by rejecting Ho1. The path between Trust and intention was found to be significant (ß7= 0. 458), there by rejecting Ho7.
The path between Perceived Usefulness and intention was found to be significant (ß13= 0.590), there by rejecting Ho13. In fact, Attitude has the strongest effect with a path coefficient of 0.43 emphasizing the important role of an individual's Perceived Usefulness in driving his/her intentions towards adoption of e-Payment.

The path between Perceived Behavioural Control and intention find to be significant (ß3=0.541) there by rejecting Ho3. The path between Perceived Behavioural Control was found to be significant (ß2= 0.541) and there by rejecting Ho2.

Explaining Attitude

The path between Perceived usefulness and attitude was found to be significant (ß12= 0.584), there by rejecting Ho12. The path between Perceived ease of use and attitude was found to be significant (ß11= 0.468), there by rejecting Ho 11. The path between Trust and attitude was found to be significant (ß4= 0.486), there by rejecting Ho4.

Explaining Perceived Usefulness

Perceived usefulness is significantly defined by Perceived ease of use (ß9= 0.332), a jointly 36.7% of the total variance explained. The path between Perceived ease of use and Perceived usefulness was found to be significant (ß9= 0.332), there by rejecting Ho9.
Explaining Trust
Perceived Ease of Use accounted for 24.8% variance in Trust Path between Perceived ease of use and Trust was found to be significant (ß10= 0. 387), there by supporting Ho10 .

Trust has significant effect on Attitude (ß4= 0.486). Moreover, trust has positive effect on Perceived behavioural control (ß5= 0.268) and is considered as an important antecedent of perceived behavioural control in e-Payment services. In other words, the trust beliefs will be able to increase customers' perceived behavioural control in performing the behaviour.

On the other hand, trust (ß6= 0.379) significantly influences subjective norm while explaining only 14.4% of the total variance in subjective norm. The reason for this is twofold. First, this indicates that while users establish the initial trust in e-Payment, it will help enhance the users' normative beliefs about the expectations of referents such as friends, peers, and superiors who concern the initial adoption of the e-Payment. The connection between user's trust and perceived social

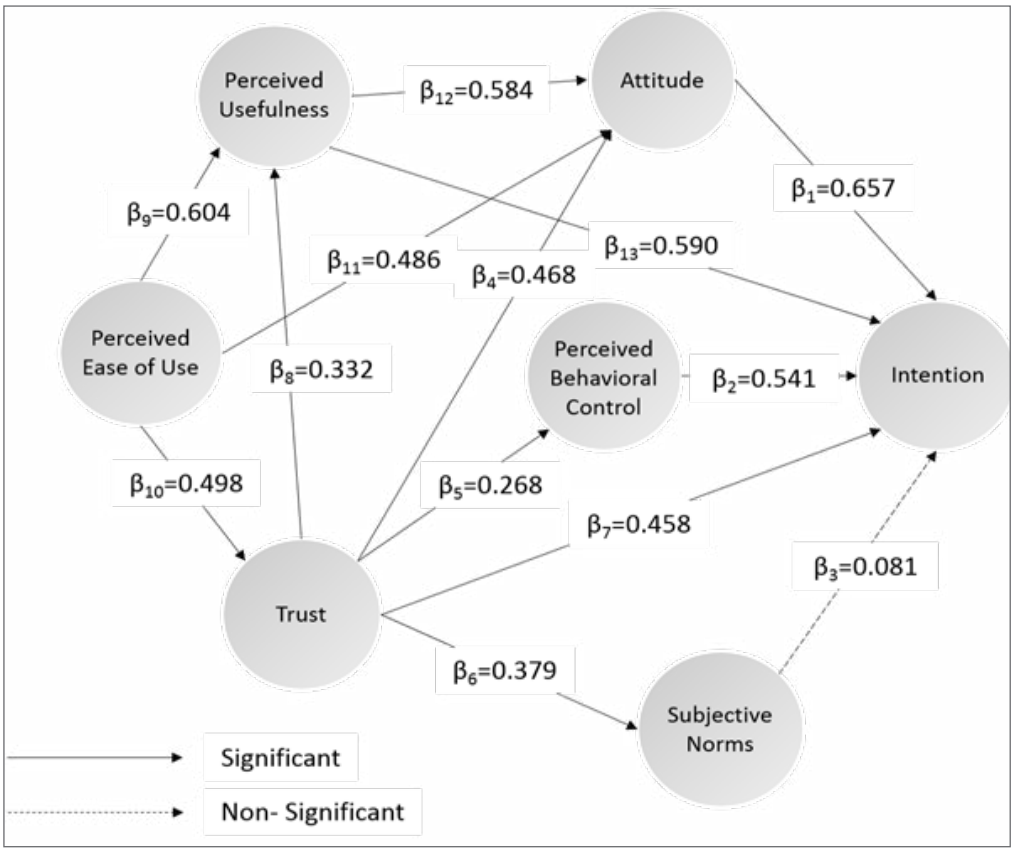
pressure to adopt E-Payment seems to be expectable as the underlying definition in this model. In addition, this study indicates that trust almost plays an important role on Perceived usefulness (ß=0.332).

The implication of these findings and conclusions are that, e-Payment service provider need to play a leading role in influencing the perception, and there by the attitude and behaviour of current and potential e-Payment users. The outcome of this study has two practical implication for banks and e-Payment service providers for improving the use and acceptance of these services.

Awareness of e-Payment services is essential in the early adoption stages. As e-Payment services are still new in Nepal, effective presentations using all forms of media advertising such as leaflets, brochures, web pages, etc., will be useful to introduce the services to a wider audience and educate potential customers about the benefits of e- Payment. To access more potential adopters, information about e-Payment should be provided by bank tellers and bank assistants at branches and by service intermediaries at their counters.

The information should include references to "time saving", "convenience" at anywhere any time, "low costs", and "information availability". In addition, banks should design their web sites as effective delivery channels and offer information beyond banking services.

It is essential to provide a well-designed and user-friendly web site to attract potential adopters' attention. The customer should not be required to expend a lot of effort or time, or undergo too great a change in behaviour, to adopt e-Payment services. (Abbreviations: ATT-Attitude,



NS-Not Supported, PBC-Perceived Behavioural Control, PEOU- Perceived Ease of Use, PLS- Partial Least Square, PU- Perceived Usefulness, S- Supported, SEM- Structure Equation Model, SN- Subjective Norms, T-Trust, TAM- Technology Acceptance Model, TPB-Theory of Planned Behaviour ,TRA- Theory of Reasoned Action) IV







Contractors Camp Facilities

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Altera Board



Xilinx Board



Spartan Board

Field Programmable Gate Array (FPGA) Technology in Industrial Application

By Shreekrishna Timilsina

FPGA is a type of Reprogrammable Silicon Chip(IC) processor, which can be configured by designer or consumer after manufacturing. It contains an array of a large number of programmable logic blocks which are connected together in different configurations to check the output of hardware or software, after and before manufacturing. It uses SRAM cells which are volatile in nature can be dynamically reconfigured and programmable logic blocks can be reprogrammed to required application.

History

FPGA is developed from PROM (Programmable Read Only Memory) & PLD`s (Programmable Logic Device) which can be reprogrammable logic gates. Nowadays many modern FPGA like Xilinx, Altera are programmed at 'speed' as a result of the reconfigurable system.

Why FPGA?

FPGA can be used to test the product before going ASIC production. Due to reprogrammable function, it is easier to reprogram rather than replacement of mechanical body. FPGA combines the best part of ASIC and processor based system, are parallel in nature so processing is faster and has the flexibility to change the design. It uses technology mapping techniques to reduce area and time delay. Hence it reduces the cost, performs faster, reliable and long term maintenance (easily upgradable) not require time & expense for the redesign.

Uses & Applications

As they are of programmable type FPGA can be used to solve any problems which are computable by using Xilinx, Micro-Blaze, SPARTAN 3E, VIVADO Design Suite and Altera NIOS II. It is used as security, networking, data center, FPGA-PC, ARM-based CPU, ASIC emulation & to get higher performance such as10/40 GBPS Ethernet, SATA Gen 3, gobs & gobs of DDK3, QDR4 memory. It is fit for many markets as industrial applications.

- Digital signal processing (DSP)
- Aerospace & defenses
- Radio broadcasting
- ASIC prototyping
- Medical imaging
- Security
- Video/image processing
- Wired/wireless communication
- Computer hardware emulation
- Audio
- Automotive
- scientific purpose

> "FPGA are the best choice for Manufacturers/ Designer for building industrial system as per the need of today's latest technology."

Application in Industrial approach

FPGA provide Xilinx FPGAs, ALTERA, SPARTAN-67, PYNQ board and many design platforms for the industrial, scientific & medical field.
SPARTON-6 FPGA: industrial networking, Motor control.
Artix-7 FPGA: Motor control, I/O module.
Kintex-7 FPGA: Computational/DSP/Video data processing.
Zynq-7000Epp: Machine vision, Motion control platform & Video surveillance.

- Industrial imaging & surveillance
- Industrial networking
- Motor control
- Precision control system
- FPGA based feedback control system
- Robotics
- Embedded monitoring
- Autonomous vehicle
- Machine vision



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Industrial imaging:
Industrial imaging is the process used to form images of any system in engineering. Modern industrial factories use a camera to check reliability and quality standard during the manufacturing process. This industrial imaging can be used in industrial process monitoring, industrial robotics, autonomous vehicles, quality control, industrial robots, thermal monitoring, food inspection, metrology, microelectronics inspection, bottle inspection etc. Xilinx industrial imaging provides prototyping, video surveillance, streamline industrial effort and machine vision system.

Video surveillance: FPGA provides differentiation factor and processing power to implement night vision cameras, dome camera, HD/IP-based video; intelligent camera to capture and process data at real time in industrial networking. User can implement image processing pipeline, WDR and video processing.

Industrial networking:
Industrial networking protocols provide seamless communication between modules, allowing components from different manufacturers to plug and play provided they use the same protocol. Device level provides communication between module such as motor driver and sensors, use of Ethernet provide communication between various factory sites.

Motor control:
Motors are ubiquitous for industrial application and industrial system consumes 66% of electrical power. As a cost of power increases, automation of factories increases, to get precision and efficiency motor control electronics should be known. MCU operating at low frequency fulfill the need of motor control application. FPGA provide low cost, robustness, greater performance, DSP capability. The motor control function is built on SPARTAN 6-7 series, Zynq- 7000 AP SOC chip by using Xilinx multiple motors can be controlled by same times.

Industrial process control:
Industrial process control is related to the maintaining the output process of process within desired range such as distillation system maintains the temperature of the system at a certain range. Zynq-7000 AP SOC is used.

ASIC prototyping:
ASIC(Application Specific Integrated Circuit) prototyping with FPGA provides fast and accurate system modeling and verification. It reduces the system power consumption, driver flexible I/O to create a contiguous device, reduce board space and complexity and eliminate the need for multi-chip partitioning in many instance.

Security system:
FPGA can be used for security purpose. Wireless security system, alarm system, WLAN security system, internet security, adding intelligence to video security, home security and so on with its flexibility and adaptability to different security oriented sectors.

Industrial robotics:
Industrial robots are professional robots which are used to perform multiple programmed tasks in manufacturing production. They are also used to perform a dangerous task which is not suitable for human. By using FPGA-based system there is a great revolution in autonomous industrial robots. Robots are used in industry as labeling, welding, painting, packaging and labeling, pick and place, product inspection and testing.

Machine vision:
FPGA are used in factory automation to inspect manufacturing lines for quality control & item packaging purpose. FPGA could be used by skilled manpower or engineers with deep knowledge & understanding of digital hardware design. Because of its flexibility and reprogrammable functionality it provides faster time to production & overall reduces the huge amount of cost in industrial automation and medical imaging equipments. Xilinx &Altera are the current leader in industrial purpose as they control around 80% of the market. The programmable logic controller is also used in industry for managing temperature control of distillation process.

Autonomous vehicle:

The autonomous vehicle represents driverless car or driver assistance .It consists of collision avoidance, semi-autonomous system, a vehicle to vehicle tracking, gesture recognition, augmented reality HMI(Human Machine Interface), automatic camera image processing, video surveillance, short range and long range radar, ultrasonic and intelligence. Xilinx provides a flexible way with programming and software to the autonomous system.

Industrial communication:
FPGA Spartan-6 is used as an Ethernet kit used for connectivity provides 5G internet speed such as 10/40 GBPS which greatly helps in faster communication in industrial areas.

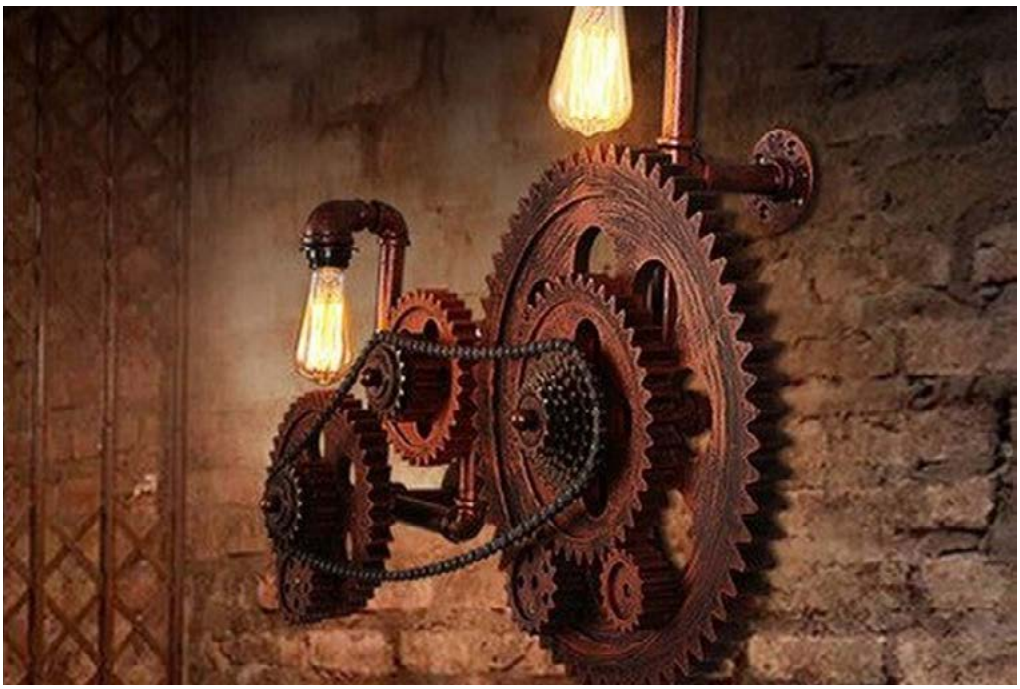
Comparison of FPGA with ASICs & Microcontroller

•Generally FPGAs are more flexible & cost effective than ASICs. ASICs IC have a specific application but FPGA are reprogrammable. ASICs can't be changed after creation but FPGA can.

•Microcontroller limited processing per memory. MCU is time limited; to do more work you need more processor cycle. Microcontrollers are simple IC chip while FPGA is made of logic blocks which can be reprogrammed.

Conclusion

FPGA are the best choice for Manufacturers/Designer for building industrial system as per the need of today's latest technology. FPGA Altera, PYNQ provides an easy way to adapt industrial design with low cost. It maximizes the design activity with the evolving latest standard and technological advancements. We can easily integrate part of the design to a single device. Because of its flexibility & reprogrammable chip to change your design & is easier to test, rebuild & able to save more time, cost and effort with great accuracy and reliability. Hence, FPGA technology is popular. IV



Industrial Retrofitting

Finding perfect fit for failing industries

By Er. Subodh Kumar Ghimire

Early bird gets the worm, but second mouse gets the cheese. Though it sounds wrong, we can proudly say that being late can have some charms. Late bloomers have some advantage. Just make sure you bloom; time does not matter. We can apply same thing when it comes to technologies, being late in buying a mobile means you will get a better version at an attractive price. Everyday many technologies are getting cheaper but replacing whole manufacturing mechanism with new one is next to impossible. In this context, revival of old mechanism with a renewed technology is vital. Yes, we are lagging behind in technologies and Yes, we have upper hand to directly grab advantages from latest technologies.

There have been a variety of change in technologies used in industries, thing that used to amaze us in past are really common nowadays and there are again new ways of doing tasks that equally amazes us. Programmable Logic Controllers (PLC) was once items of sophistication, now a cheaper knock-off can be obtained at mere $35 from aliexpress. And amazingly it works just fine with touch screen at $504. These when mixed with proper skill can perform any task with full or partial automation. We have spent a lot of time in dreaming about the technologies we want, and automation we hunt to tackle our tedious tasks. It is true that it was a long shot and technical enthusiasts were killing their itch just by skimming them through youtube. But now time has changed, things we viewed are now the things we do.

> “Workable technologies are developed within nation that can someday lead to a self-sustained industrial revolution that we all desperately dream of.”

We were lagging in sophistication of technology but we can have a huge advantage by starting with things that are already optimized. Instead of developing out technology from scratch, we can attach latest technology to our scrap. Our major target here is to facilitate old or outdated machineries with latest advancement of control for its optimum usages. The dream is to manufacture proper automated machineries here in Nepal but until then it is essential to bring occasional slight changes in everything we do. We know nothing constant but constant change is crucial to flourish, and it can be brought in by little but continuous advancement.

After 2015 earthquake term ‘retrofit’, have grown its use and have successfully re-established, re-engineered broken houses to even better performance. Same story can be applied for machines. We do have old machineries that are not updated from decade, such industries were established from external supports but unfortunately, we failed to operate them as per present demand. They desperately seek re-engineering. Ministry of Industries’ proposal to revive Nepal Drugs Limited is a milestone in this vision. Though Nepal Drugs Limited is already sick government enterprise, everybody’s keen interest to make it up and running is certain to open up a trend in industrial retrofit in Nepal. Basic corrosion and loss of proper control system are the reason for most of the failure. We have the resources and knowledge to retrofit them for their renewed operation. Task of machine design and development of



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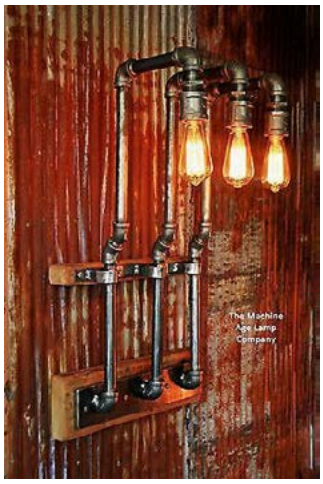
properly timed mechanism is the hardest part. We can take those for granted, and reestablish the machineries as if they have been developed in present days. To put these in simple words, composing a song is hard-hitting job that requires high intellectual skills compared to remix them. But If we look into market, remix sales better.

Ministry of Industry also plans to revive other public enterprises like Agriculture Equipment Factory Ltd, Gorakhkali Rubber Industry, Nepal Metal Company, Birgunj Sugar Factory Ltd and Butwal Sugar Factory Ltd, among others, that have remained shut since long. These long-lost heritages cannot be revived to their original status, they will not be able to cope the market pressure and will ultimately die again. But, giving them a new face and new status in production might help them to stay upfront until next big reform arrives. Retrofitting Industries is clearly an expensive way to quick fix problems in machineries that comes cheaper than getting everything new.
Retrofitting can also be done for small repetitive tasks. A simple digital weighing scale can be made to communicate with computer, automatically make necessary modification of data in excel sheet (evaluating dynamic gross and net weights) and directly printing as a predefined label for the weighing company.



Here, digitally controlling mechanisms is the first step toward development of computer numeric control (CNC) technologies. When we can establish a proper retrofitting for machineries we can definitely dream about developing advanced automation in country.

In Nepal, home based cottage and small scale industries are prone to success to a limit. When it seeks growth, the gap is extremely large.



Retrofitting of machineries for such industries also provides a bridge to avoid sudden failure of business. It provides a transitional phase for the industry to taste automation before fully investing in it. If we consider a simple paper cup industry, hand- operated with meek heat machineries can be re-engineered into motor operated ones, with change in time we can also introduce sophistication in its control. After this, when we have significantly increased the production quantity, we can aim toward automatic stacking, labeling and packing facilities. Proper fully automated paper cup production machinery is readily available as an alternative and is also cheaper than whole retrofitted machine. But retrofitting facilitates by gradual increment of ability in machineries and you only pay for what you want. It is more like installing new machine in easy installments. With low establishment cost it proves to be a best option for developing country like Nepal.

> “With low establishment cost it proves to be best option for developing country like Nepal.”

As mentioned earlier, technologies are already at our disposal along with its cheaper components. All we need is proper manpower with fine knowledge of mechatronics form colleges and a problem-solving attitude from within. This is clearly an untapped sector of Engineering, People talk about repair, maintenance and selvage. Entrepreneur can benefit a lot by retrofitting. Aged pharmaceutical machinery that can no longer operate as per required standard can do splendid job at local Titaura industry with simple modification. This makes win-win situation for each stakeholder. There can literally be millions of ideas on making ones' waste to others wealth. Such synergy of industries was expected to occur within various industrial estates. Unfortunately, it is all being unused. This can be a good job prospect, technical junk or scrap dealer with high end clients and profits. Retro fitting generates spontaneous job opportunities for pupil, there are many parties as well as many transactions involved in the process. This creates good and sustainable economic flow. Workable technologies are developed within nation that can someday lead to a self-sustained industrial revolution that we all desperately dream of.

IV

MANUFACTURING

FACILITIES AND INFRASTRUCTURE FOR MANUFACTURING IN NEPAL



DISTRIBUTION OF MANUFACTURING INDUSTRIES, INDUSTRIAL DISTRICTS AND SEZS



AREAS OF INVESTMENT

FMCGs

GARMENTS

CEMENT

PHARMACEUTICAL

METAL PRODUCTS

MANUFACTURING SUB-SECTORS BY GDP VALUE ADDED



6.3%
CONTRIBUTION TO GDP

1.18%
AVERAGE SECTOR GROWTH IN LAST 10 YEARS

41%
SHARE OF TOTAL REGISTERED FIRMS

$90
MINIMUM MONTHLY SALARY

उद्योग मन्त्रालय

उद्योग विभाग

त्रिपरेश्वर काठमाडौं

"धन कमाउन व्यापार गरौं,
धर्म कमाउन दान गरौं ।"

"ईज्जत पाउन समाजसेवा गरौं,
ती सबै पाउन उद्योग गरौं ।।"

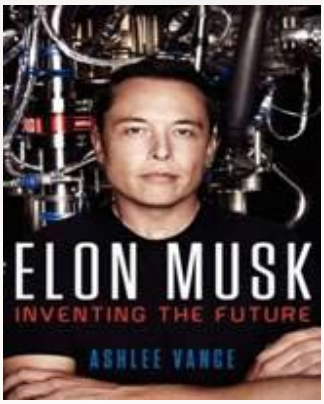
BOOKS



SHOE DOG: A MEMOIR BY THE CREATOR OF NIKE

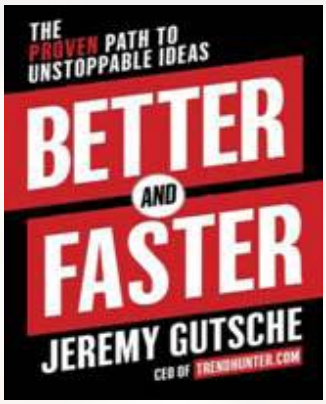
Written by: Phil Knight
Rating: 4.4/5

" A memoir from the creator of Nike, with insight, humor and wisdom, this book teaches us building something from scratch, and ultimately leaving your mark on the world."
- *Google Books*



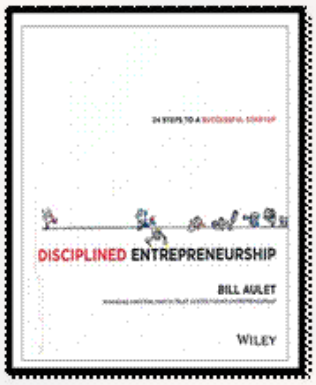
ELON MUSK: THE INVENTION OF FUTURE

Written by: Ashlee Vance
Rating: 4.2/5
" Elon Musk is a look at the extraordinary life of Silicon Valley's most unpredictable, and ambitious entrepreneurs, Elon Musk—a real-life Tony Stark. "
- *Google Books*



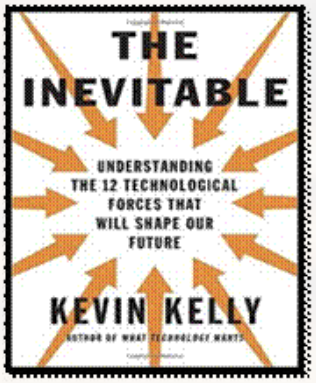
BETTER AND FASTER: THE PROVEN PATH TO UNSTOPPABLE IDEAS

Written by: Jeremy Gutsche
Rating: 4.1/5
" A book that helps to be a better innovator, manager, and investor, this book will make you BETTER and also FASTER. "
- *Amazon*



DISCIPLINED ENTREPRENEURSHIP: 24 STEPS TO A SUCCESSFUL STAR

Written by: Bill Aulet
Rating: 4.3/5
"Great entrepreneurs aren't born with super powers. This book will change the way you think about starting a Company"
- *Amzon*



THE INEVITABLE

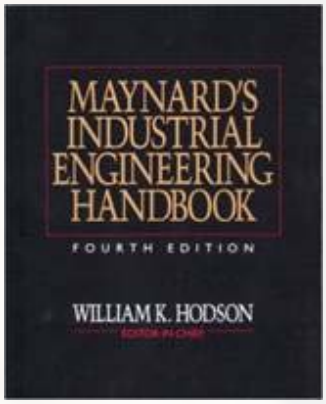
Written by: Kevin Kelly
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" In the book he outlines twelve trends that will forever change the ways in which we work, learn and communicate."
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DISCIPLINED ENTREPRENEURSHIP: 24 STEPS TO A SUCCESSFUL STAR

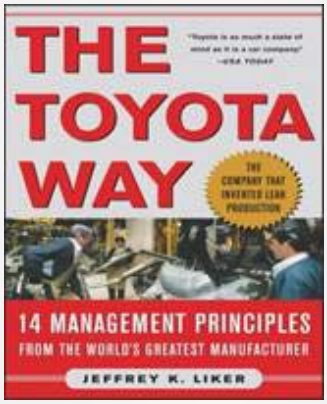
Written by: Gary Keller & Jay Papasan
Rating: 4.4/5
"By discussing principle of choosing a single task to work on, this book theoretically shows how to maximize the efficiency of that task and the overall project."
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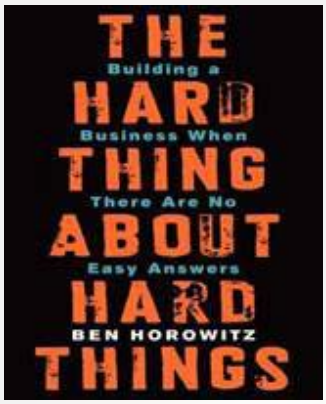
MAYNARD'S INDUSTRIAL ENGINEERING HANDBOOK

Written by: Harold Bright
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" This handbook keeps the industry principles and practices at your fingertips. it is a must read. "
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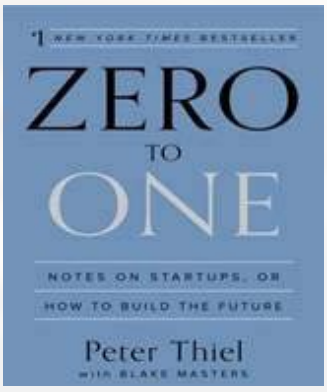
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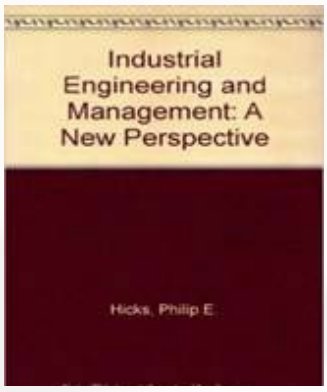
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Rating: 4.18/5
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- *Good Reads*



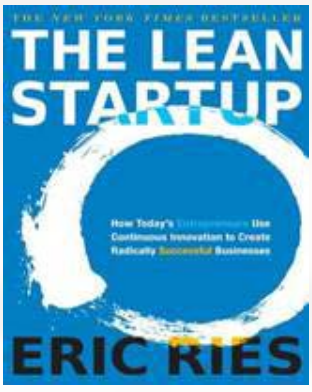
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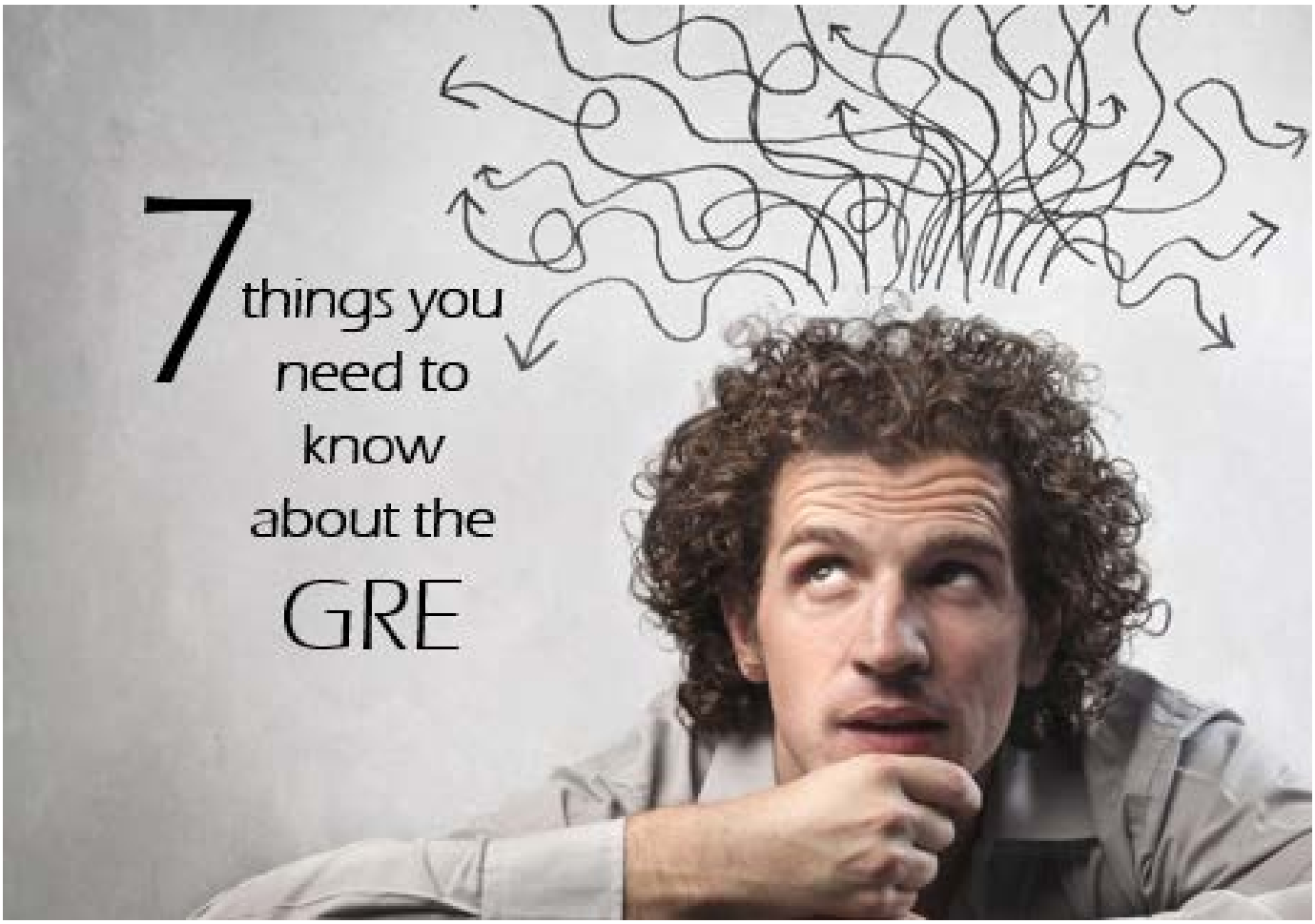
THE LEAN STARTUP

Written by: Eric Ries
Rating: 4.3/5
" This book describes Eric Ries's proposed lean startup strategy for startup companies. "
- *Good Reads*

ADVERTORIAL

GRE Primer: Top 7 Things to Know

The GRE has, over the years, become almost synonymous with Graduate Education in the USA, and we demystify this important examination through a series of posts. This first post talks about seven key things to know about the GRE through questions that we have seen cropping up in the minds of the GRE aspirants whom we have guided and coached over the years.



What is the GRE?

The **Graduate Record Examination** is a usually computer based test that is a standard admissions requirement for graduate programs across the USA, and tests verbal, quantitative and analytical skills.

Who accepts GRE scores?

Most graduate programs in the USA (Master's and PhD programs) have a mandatory GRE requirement. Certain schools in other countries use the GRE as well, and the list is dynamic and keeps changing. You can find an up to date list on the ETS website. Almost all business schools in the US now accept a GRE score instead of a GMAT score, and an increasing number worldwide have started this practice.

What are the sections within the GRE?

There are two verbal sections, that each have 20 questions and give you 30 minutes to solve them.

There are two quantitative sections, which have the same number of questions, and are to be completed in 35 minutes each. There is also an hour-long analytical writing section, which contains two essays – testing how well you can write about an issue or structure an argument.
In addition, there is also an Unscored section which can either be a Verbal section or a Math section. So, a student can get 3 Verbal sections or 3 Maths sections in the GRE exam. If a student gets 3 Maths sections, then one of the sections is Unscored, and if he gets 3 Verbal sections, then one of them is unscored. However, a student will not know which section is scored and which is not.

Is the GRE really as hard as everyone says it is?

The GRE is hard, but not even close to very hard, let alone impossible. It requires months of dedicated study and practice with the help of experts, but the good news is that, if you follow the right coaching regimen and start well in advance, you cannot help but score well. To sum up, it's really easy if you know how. **We have deep experience in coaching different kinds of students for the GRE, including those who have problems with verbal or quant; we are confident we can help you.**

What is the maximum score on the GRE?

The highest mark you can get (Quant and Verbal combined) is 340 / 340, and the lowest is 260 / 340, with every integer score in between 260 and 340 being a possible final score. On the AWA section, you are scored on a 0-6 scale with).5 point increments.

When should I take the GRE?

You should ideally choose a GRE date between three and six months before the date you will need to apply. Increasing numbers of students are taking the GRE well before their application date – sometimes a little more than a year before they graduate – so that they can capitalize on the greater time to study in their pre-final year, and use the fact that **GRE scores are typically valid for five years.**

How do I prepare for the GRE?

First, you need to find a coach. The GRE is one of the tougher competitive exams for higher education, and you will maximize your chances of success if you find someone who has helped others succeed at it. Ideally find a reputed institute whose impact analysis you can find online – for example, Jamboree has a great track record at preparing motivated individuals for the GRE, and we have many **GRE coaching programs**, one of which is sure to fit your unique situation.

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Dean, Institute of Engineering

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Er. Ishwor Chandra Baniya
Campus Chief, Thapathali Campus
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Design of BSL Lab

Safety and health at the forefront

Er. Amrit Baniya

Today's laboratories are the incubators for tomorrow's discoveries. The nature of the laboratory work requires the use of potentially hazardous materials, complex equipment that must be integrated with building systems, and highly technical procedures and operations. It is therefore very important that the laboratory be designed with safety and health at the forefront.

BSL Level 2 laboratory practices are among those safety procedures which are suitable for work involving agents of moderate potential risk to personnel and the environment. Here's how it is designed.

Clean Room Classification

- Classification: Level of airborne articulate cleanliness, represents maximum allowable concentrations (in particles per cubic meter of air) for considered sizes of particles.
- Particle: Solid or liquid object which, for purposes of classification of air cleanliness, falls within a threshold size in the range from 0.1 to 5µm
- Occupancy states
- As-built: installation is complete, all services functioning, no production equipment, materials, or personnel present
- At-rest: no personnel present
- Operational: the installation is functioning in the specified manner, specified number of personnel present and working

> "BSL Level 2 laboratory practices are among those safety procedures which are suitable for work involving agents of moderate potential risk to personnel and the environment."

ISO classification number (*N*)	Maximum concentration limits (particles/m³ of air) for particles equal to and larger than the considered sizes shown below (concentration limits are calculated in accordance with equation (1) in 3.2)					
	0,1 µm	0,2 µm	0,3 µm	0,5 µm	1 µm	5 µm
ISO Class 1	10	2				
ISO Class 2	100	24	10	4		
ISO Class 3	1 000	237	102	35	8	
ISO Class 4	10 000	2 370	1 020	352	83	
ISO Class 5	100 000	23 700	10 200	3 520	832	29
ISO Class 6	1 000 000	237 000	102 000	35 200	8 320	293
ISO Class 7				352 000	83 200	2 930
ISO Class 8				3 520 000	832 000	29 300
ISO Class 9				35 200 000	8 320 000	293 000
NOTE Uncertainties related to the measurement process require that concentration data with no more than three significant figures be used in determining the classification level						

Grade	Maximum permitted number of particles/m³ equal to or greater than the tabulated size			
	At rest		In operation	
	0.5µm	5.0µm	0.5µm	5.0µm
A	3,520	20	3,520	20
B	3,520	29	352,000	2,900
C	352,000	2,900	3,520,000	29,000
D	3,520,000	29,000	not defined	not defined

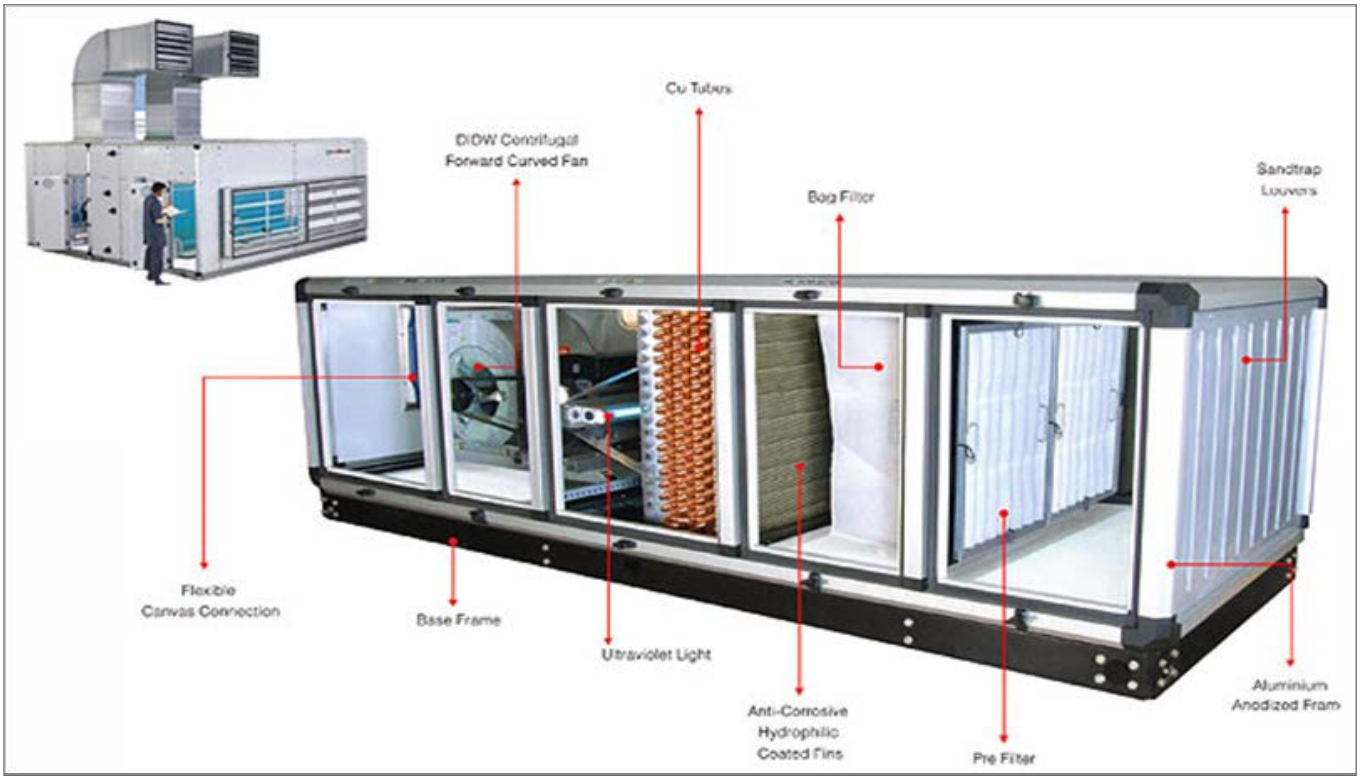


Er. Amrit Baniya is a HVAC Engineer (Heating Ventilation Air Conditioning Engineer) at Navin Distributors Pvt. Ltd, Kathmandu, Nepal. He can be reached at amrit.himalref@gmail.com.

Class EU GMP	Maximum particles/m3						FED STD 209E equivalent	EU GMP Classification
	≥0.1µm	≥0.2µm	≥0.3µm	≥0.5µm	≥1µm	≥5µm		
ISO 1	10	2.37	1.02	0.35	0.083	0.0029		
ISO 2	100	23.7	10.2	3.5	0.83	0.029		
ISO 3	1,000	237	102	35	8.3	0.29	Class 1	
ISO 4	10,000	2,370	1,020	352	83	2.9	Class 10	
ISO 5	100,000	23,700	10,200	3,520	832	29	Class 100	Grade A and Grade B
ISO 6	10 x 106	237,000	102,000	35,200	8,320	293	Class 1,000	
ISO 7	10 x 107	23.7 x 106	10.2 x 106	352,000	83,200	2,930	Class 10,000	Grade C
ISO 8	10 x 108	23.7 x 107	10.2 x 107	3.52 x 106	832,000	29,300	Class 100,000	Grade D
ISO 9	10 x 109	23.7 x 108	10.2 x 106	3.52 x 107	8.32 x 106	293,000	Room air	

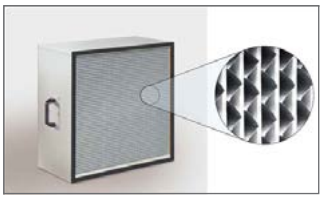
Air Handling Units

An air handler, or air handling unit (often abbreviated to AHU), is a device used to regulate and circulate air as part of a heating, ventilating, and air-conditioning (HVAC) system. An air handler is usually a large metal box containing a blower, heating or cooling elements, filter racks or chambers, sound attenuators, and dampers. Air handlers usually connect to a ductwork ventilation system that distributes the conditioned air through the building and returns it to the AHU. Sometimes AHUs discharge (supply) and admit (return) air directly to and from the space served without ductwork.



Construction:

- Double skin panel in accordance with BS EN 1886 : 1998 with 43 mm thick PUF insulation having density 38 Kg/ cubic meter in construction
- Inner & Pre-coated outer skin of GI having 0.63 mm thickness. AHU with thermal break profile, coving.
- Mixing chamber
- Pre filter section with 10 micron filter
- Fresh air damper with 10 micron filter
- Centrifugal fan as per AMCA certified for sound & air performance., Motor EFF – 2
- CHW/DX coil section with 6/8 row deep with SS drain pan
- Fine filter with 3 micron
- Bleed air damper with 10 micron filter
- With supply & return air damper.
- The AHU shall be with Limit Switch, Emergency Light, Guard for Inspection Door & as per standard.



High-Efficiency Particulate Arrestance (HEPA)

High-Efficiency Particulate Arrestance (HEPA), also sometimes called high-efficiency particulate arresting or high-efficiency particulate air, is a type of air filter. Filters meeting the HEPA standard have many applications, including use in medical facilities, automobiles, aircraft and homes. The filter must satisfy certain standards of efficiency such as those set by the United States Department of Energy (DOE). To qualify as HEPA by US government standards, an air filter must remove (from the air that passes through) 99.97% of particles that have a size of 0.3µm.

Construction:

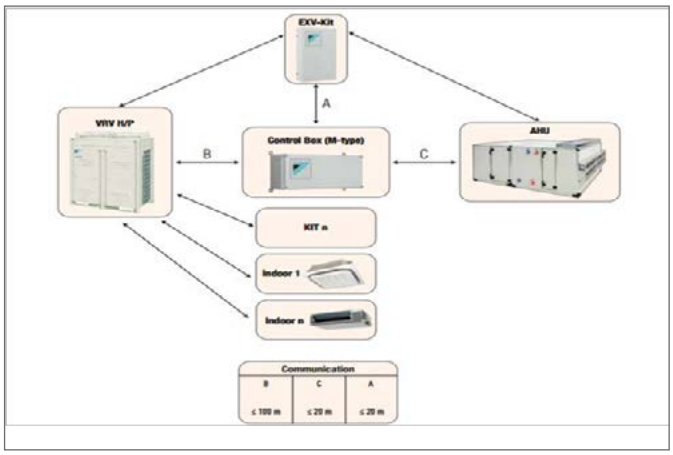
HEPA filter media is made



up of countless randomly-arranged fibers which together form a dense mat; when air flows through the filter, the media captures and contains contaminant particles throughout its depth.

Condensing Unit (Outdoor)

It is the composition of compressor and condenser. It should have inbuilt with reverse valve mechanism & heat pump, defrost unit inbuilt and shall be in operation in low-temperature conditions without affecting the room conditions. Reverse cycle air conditioners, or heat pumps as they're commonly known, work by extracting heat from outside air and transferring it inside. They use a refrigerant to warm (or cool in summer months) the air that is being drawn inside. They can also filter and dehumidify the air. Heat pump heaters are also generally more efficient than other electric heaters. Such type of Unit is used especially for the context of Nepal since Nepal has two main seasons- summer and winter and very wide range of ambient temperature.



AHU integrated with Condensing Unit with Allowable Height

Average allowable length for connection unit is mentioned in the figure. This length should always be considered while designing the system. There is an important role combo set of expansion kit and control for the connection of the system.

Outside Condition	Dry Bulb Condition ° F	Wet Bulb Condition ° F	Relative Humidity	Grains/ Pounds
Summer	89.6 ° F	85.44 ° F	85 %	216.74
Monsoon	77 ° F	75.81 ° F	95 %	159.26
Kelvin	32 ° F	27.63 ° F	60 %	18.79

Design Criteria
Location: Kathmandu
Altitude: 1400 meters from Sea Level
Temperature: 24 °C ± 2
RH: 55 ± 5 %

Based on the data, we have to do the heat load calculations and the same is attached under.

Various highlights of the proposal are as under:

- *Based on the total cooling capacity we have to install different capacities of Out Door unit to be inbuilt with reverse valve mechanism & heat pump, defrost unit in built and shall be in operation in low temperature conditions without affecting the room conditions.*
- *Supply and return air ducts will be taken and all the ducts are insulated and also water proofed by proving FG cloth over the insulation*
- *All the class D/C areas are provided with terminal HEPA (High-Efficiency Particulate Arrestance) filters.*
- *While calculating the cooling capacity it is assumed that all the slabs which are exposed to sun will be duly insulated with 50mm thick PUF. Since, you are going with pre-fabricated clean room ceiling panels this under deck will be compensated by the ceiling panels. In case you are going with standard gypsum/calcium silicate false ceiling then this insulation has to be done for AC areas.*



Photo: Sean James

- *For controlling humidity, electric heaters are provided during monsoon season along with air stats, humidity controllers and necessary provision in electrical switch gear.*
- *All the components required to complete the system chiller, primary pumps, air handling unit, supply air ducting, insulation, terminal HEPA box, terminal HEPA filter, diffuser, electric panel, power cable, control cable, earthing, controller etc. should be included.*
- *All the variable items like ducting, insulation, CHW/ DX piping, cable, riser, etc will be adjusted as per the actual site measurement.*

> "Today's laboratories are the incubators of tomorrow's discoveries!"

Factor Considered while doing Load Calculation

- *Design Criteria*
- *Electrical Load, Equipment Load, Human Load*
- *Infiltration air*
- *Solar Heat Gain Factor*
- *Transmission Heat Gain Load and many more.*

IV



लघु तथा साना जलविद्युत, सौर्य ऊर्जा, गोवरग्यास, सुधारीएको चुलो, वायुऊर्जा जस्ता नवीकरणीय ऊर्जा प्रविधिहरु प्रयोग गरौ। वन जंगल जोगाऔं, वातावरण संरक्षणमा सहयोग गरौं ।







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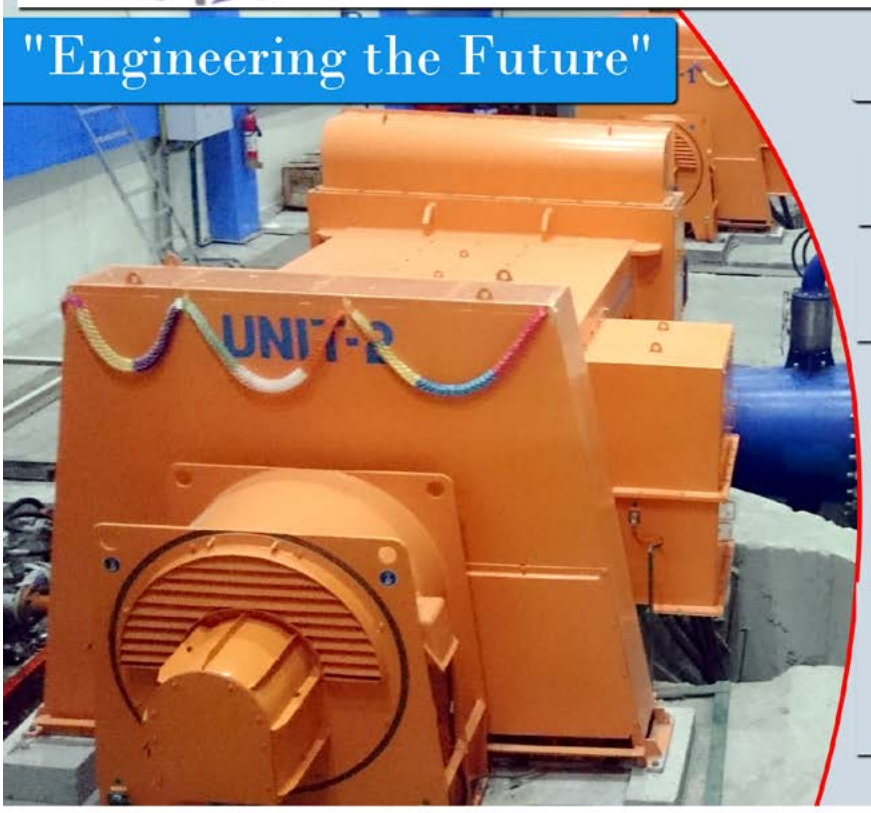
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Demand Planning

By Daniel Andrés Palencia Castro

I. INTRODUCTION

In order to have an optimal level of service and be competitive, one of the primary objectives for companies is to properly and effectively meet the requirements of the client. Therefore, to be successful, the companies must react quickly to the minor change arising on the demand. To achieve this, planning and control activities become essential, which require precise forecasts and predictions of the product volumes and service that will be managed and then will influence in decision making.

The forecast of the levels of demand is vital since it not only provides the input data for planning and control of logistics but also all of the functional areas, including marketing, production and finance.

II. DEMAND PLANNING CONCEPT

Demand planning serves to make estimates of the volume of products or services that will be handled, taking into account various factors; all this in view of providing the input data for the planning and control of all the functional areas. This allows calculating the requirements, levels of ability, and financial needs of each area in the time horizon to which the volume of product or service was forecasted.

III. IMPORTANCE OF DEMAND PLANNING IN THE LOGISTICS

- It helps improve the efficiency of the chain of supply and reach major indexes of profitability.

- It improves the levels of service

- It optimizes the indexes of stock, the improvement of the management of the inventory, the storage and the activities inside the distribution centers.

- It helps decrease the variability inherent to the stochastic factor of demand, the whip effect, which has very big consequences in the efficacy and effectiveness of the logistics.

- It manages to diminish and to control the variability generated by working with an uncertain future with the appropriate follow-up of the planning.

> “Demand planning is a fundamental tool for the proper development of logistics processes and all areas of a company.”

IV. DEMAND TRENDS

The basic trends that describe the behavior of a demand are:

1. **Horizontal:** The fluctuation of the data varies around a constant average.

2. **Trend:** The increase or decrease of the average of the demand over time.

3. **Seasonal:** Repeatable pattern of increases or decreases in the demand, depending on the time of day, week, month or season.

4. **Cyclical:** A pattern of gradual and less predictable increases or decreases in the demand, which occur over longer periods.

5. **Random:** Unpredictable variation of the demand.

V. TYPES OF DEMAND

According to various criteria, the demand can be classified as follows:



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• Spatial demand and temporal demand:
The temporal demand refers to the variation in demand over time because of the increasing or declining of sales rates. Spatial demand refers to the spatial location of demand, which serves to plan warehouse location, balance inventory levels across the logistics network and allocating transportation resources.

• Irregular demand and regular demand:
Demand is considered regular when it can be represented by any of the general trends. Whereas, a demand is considered irregular when it is intermittent, due to a low volume and a high degree of uncertainty in both the moment and the quantity in which the level of demand will be presented.

• Derivative demand and independent demand:
Many customers generate an independent demand when they acquire individually only a fraction of the total volume distributed by the company. Meanwhile, demand is derived when it depends on the requirements specified in a production program. For example, the number of tires that will be needed for the manufacture of bicycles

VI. FACTORS INFLUENCING DEMAND FORECASTS

1. Historical Demand
2. Lead time of the products
3. Planned advertising
4. State of the economy.
5. Planned price discounts
6. Competence actions

VII. METHODS TO FORECAST THE DEMAND

There are different standardized methods for forecasting demand, which vary according to the planning horizon and according to other factors such as the underlying rationale.
Qualitative methods:
Use intuition, surveys or comparative techniques to generate quantitative estimates about the future. Information related to factors affecting the forecast is usually non- quantitative, intangible and subjective. These methods are the only ones available when trying to predict the success of new products, or the impact of a new technology.
Methods used: cumulative techniques, market research, consensus groups, historical analogy, and Delphi method.

Historical projection methods: They are used when a quantity of historical quantitative information is available and the trend and seasonal variations in the time series are stable and defined. The projection of this information to the future can be an effective form of forecast for the short term.



Time series stimulates the use of mathematical and statistical models as the main forecasting tools.

Methods used: Simple moving average, weighted moving average, exponential smoothing, regression analysis, Box Jenkins technique, Shiskin time series, and trend projections.

Causal methods: These methods are based on the premise that the level of the predicted variable is derived from the level of other variables.
For these models to be good at anticipating major changes in time series, it is important to describe cause-effect relationships. They are recommended to accurately forecast over a medium to long-term period.
Methods used: regression analysis, econometric models, input / output models.

VIII. SPECIAL PROBLEMS OF PREDICTION

Sometimes there are special problems that affect demand forecasts, which are as follows:

- **Start up**

The introduction of new products or services and the need to provide logistical support for them create the common starting conditions. Possible approaches to address this problem are: First put the initial estimate in the hands of the marketing department, until you have sales information about six months, (they know the level of promotional effort, early customer response and acceptance expected). Second, it is possible to estimate a forecast based on the behavior of the demand for products within the line. Third, if you work with the exponential smoothing model for forecasts, an exponential adjustment constant value of 0.5 or greater is recommended to give you greater weight to the actual demand.

- **Irregular demand**

This problem represents the condition where there is so much random variation in the demand pattern that can overshadow trend and seasonal patterns.
Patterns of irregular demand are difficult to predict accurately by mathematical methods, due to the wide variability in the time series. However, some suggestions on how to treat them are the following:
First, look for obvious reasons for the irregularity and use them to generate the forecast, separating the forecast of products with irregular demand from those showing a regular trend. If no causes attributable to the irregularity are found, use a simple and stable forecast method that does not react quickly to the change, such as the exponential adjustment model with a low leveling constant value. Third, because irregular demand often occurs in low-demand items, the accuracy of the forecast may not be too relevant. If the forecast is used to establish inventory levels, managing a little more inventory to compensate for the inaccuracy of the forecast may be more economical than trying to handle the forecast carefully.

- **Regional Forecast**

For logistics it is necessary to decide whether to take a forecast of the total demand and distribute it proportionally by region or if it forecasts each region independently. The objective is to obtain the highest precision in the regional forecast. Forecasting all demands simultaneously will often be more accurate than the sum of individual regional forecasts. If this is so, the proportional distribution of the forecast in conjunction with the individual regions might preserve sufficient precision to give better results than the individual forecast.

- **Forecast error**

In practice, no single forecast model can be the best at all times, all have a level of error. However,
combining the results of several models can generate more stable and accurate forecasts.

IX. THE EFFECT BULLWHIP AND DEMAND PLANNING

The bullwhip effect is a phenomenon that refers to the large mismatches that can occur between the real demand of the consumers and the demand of the intermediate actors that participate in the supply chain, affecting the stock of the participants of the chain. As the supply chain climbs, demand grows because at each level of the chain the actors will add extra units for their own security stock and benefit from better prices. This causes not enough information to plan demand, so many of the forecasts are wrong and companies often have large inventories.

This makes it appear:

• Distortion of demand information.
• Loss of coordination in the chain.
• High levels of inventory.
• Lower product availability.

Therefore, sharing information on final customer demand improves the accuracy of forecasts for all members

X. PLANNING OF DEMAND AND INVENTORIES

Inventory policy should consider uncertainty, and one of the types of uncertainty that directly affects inventory policy is the uncertainty of demand, since inventory planning involves keeping inventories to meet demand requirements.
Sales planning estimates unit demand during the inventory re-stocking cycle. Even with a good prediction, demand during the refueling cycle often exceeds or falls behind schedule. As protection against a breakdown when demand exceeds prediction, security inventory is added to the basic inventory. Under conditions of uncertainty in demand, the average inventory accounts for half of the order quantity plus security stocks.
The task of inventory planning requires three steps. First, measure the probability that stocks will be depleted. Second, estimate the demand during a period of inventory re-stocking cycle. Finally, a policy decision related to the desired level of protection against depletion of stocks is required.

XI.CONCLUSION

Demand planning is a fundamental tool for the proper development of logistics processes and all areas of a company. Its development is based on the study of demand trend to generate forecasts that are as accurate as possible and that help mitigate the influence of factors that produce errors in demand such as the bullwhip effect, so that the company is protected and able to respond to the needs of the customer. In the short term, forecasts are needed to predict the needs for materials, products, services, inventories, or other resources to respond to changing demand and in the long term, forecasting is required as the basis for strategic changes, such as developing new markets, creating new products or services, and expanding or building new facilities.

IV

“In practice, no single forecast model can be the best at all times, all have a level of error. However, combining the results of several models can generate more stable and accurate forecasts.”

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> Ministry of Industry is currently working for better future of industry and sees the need and importance of industrial engineering scholars such that not only industrial engineer but also whole industrial sector and nation is profited.

Mr. Nabindra Raj Joshi

HON'BLE MINISTER OF INDUSTRY, GOVERNMENT OF NEPAL

1. What is leadership in your view? Your ideal leaders, whom you admire as an economic leader?

Leadership is an ability or skill possessed by a person, which enables them to lead their team with proper guidance, mutual respect, and understanding. A leader motivates and inspires his/her team to engage with the common vision.

Personally, I don't specifically have someone in my mind that I admire as an economic leader. I believe every person who is capable of leading his country towards socio-economic development can be regarded as an ideal economic leader. Also, an ideal economic leader believes in liberal approach against traditional approach through which socio-political and economic development of the nation is possible.

2. The best and the worst thing about the status of the Nepalese industrial sector in the present context?

The best thing has to be the 'Nepal Investment Summit 2017' which was held after almost 25 years. This summit was able to pave a glorious path for Nepal's development and will help in boosting our country towards the path of prosperity. The summit spread the word all around the globe that Nepal is the next investment hub and with this message, it has reduced the pessimism among national and international investors.

Talking about the worst thing, I, being an optimistic person, would like to believe everything is going right and even if something isn't just as what we want, I view it from the positive side and will work to make it better.

3. We're not being able to bring double-digit growth in the industrial sector and the GDP contribution of the industrial sector is also low. What are the challenges the Nepalese Industrial sector is facing at the moment to catch a rapid pace in a sustainable way? Mention the opportunities as well.

The major challenges that are responsible for low GDP contribution are political instability, lack of coordination within and outside the industry among stakeholders, poor planning and process in industries, lack of prompt necessary data and figures and so on.

To overcome these challenges, second generation reformation of the acts and policies is necessary as it is high time that we work on improving them.

> "In five years of time, Ministry of Industry is determined to significantly work in improving the industrial acts and policies which has also been one of the challenges for industrial development."

Further, these challenges must be directly addressed to the Ministry of Industry and necessary actions also must be initiated by the Ministry of Industry itself.

Also, we need to work on digitalizing the entry, operation and exit records in every industry in Nepal to maintain standardization and transparency. So, we are expecting to put forward the digital signature, online payment, and online registration policies within three months in all major departments of Ministry of Industry which not only controls the corruption but also helps in a systematic work process.

4. What are the campaigns/projects/policies that Ministry of Industry is working on to revitalize the industrial sector? What are its biggest priorities currently?

Different projects on infrastructure development, hydropower, agriculture, forestry, and mines are being carried out. In addition, we are working on forming a committee with people sharing common goal and commitment towards their work at different such projects and programs.

The biggest priority of MOI currently is to come up with projects that can best utilize the manpower such that unemployed can be employed. This not only works in creating employment opportunities but also helps in keeping the human resources of our country back here and preventing brain-drain.

scholars such that not only the industrial engineers but also whole industrial sector and the nation is profited. For this, different parameters and criteria are set according to standard requirement and feasibility of a particular industry is checked and thence industrial engineer has hired accordingly. Also,

After the recently held 'Nepal Investment Summit 2017', Ministry of Industry is confident that the right message has been widely spread that Nepal has proper industrial policies and strategies, abundant natural resources and manpower. This message will certainly attract the foreign investment



This will eventually lead to economic growth of people and hence the country itself.

5. How is ministry planning to involve industrial engineering scholars in the industrial mission of the nation? Ways to train, mentor, motivate and develop them?

Ministry of Industry is currently working for better future of the industry and sees the need and importance of industrial engineering

different policies are being planned in such a way that the recruitment of industrial engineer will be based on the investment in the firm opening the door for IE graduates in bigger enterprises.

6. How is Ministry of Industry partnering with UNIDO and other development partners to bring sustainable industrialization policies and strategies in Nepal for the growth and revival of the industrial sector?

in Nepal in coming years and these investments can be later used for the growth and development of large scale manufacturing and production industries. Eventually, there is the creation of more and more employment opportunities within the country which results in the sustainable development of the industrial sector as well as the economic condition of Nepal.



7. Is Ministry of Industry bringing programs to promote startups and entrepreneurs? How?

Yes, Ministry of Industry has thought of programs to promote startups and entrepreneurs. Very soon, MoI is planning to organize a seminar where the young entrepreneurial minds, emerging entrepreneurs, startup ideas etc are expected. In addition, MoI is concerned is forming a startup committee which will work for the betterment of entrepreneurs and boost the startup ideas. Moreover, MoI is planning in starting government courses on startup and entrepreneur development and more decisions are made afterward.

8. Where do you see Nepalese Industrial Sector in five years of time? Key changes!

In five years of time, Ministry of Industry is determined to significantly work in improving the industrial acts and policies which has also been one of the challenges for industrial development. Also, the main target is to create as much as employment opportunities by proper utilization of human resources which will contribute in improving the lifestyle of every Nepali. IV

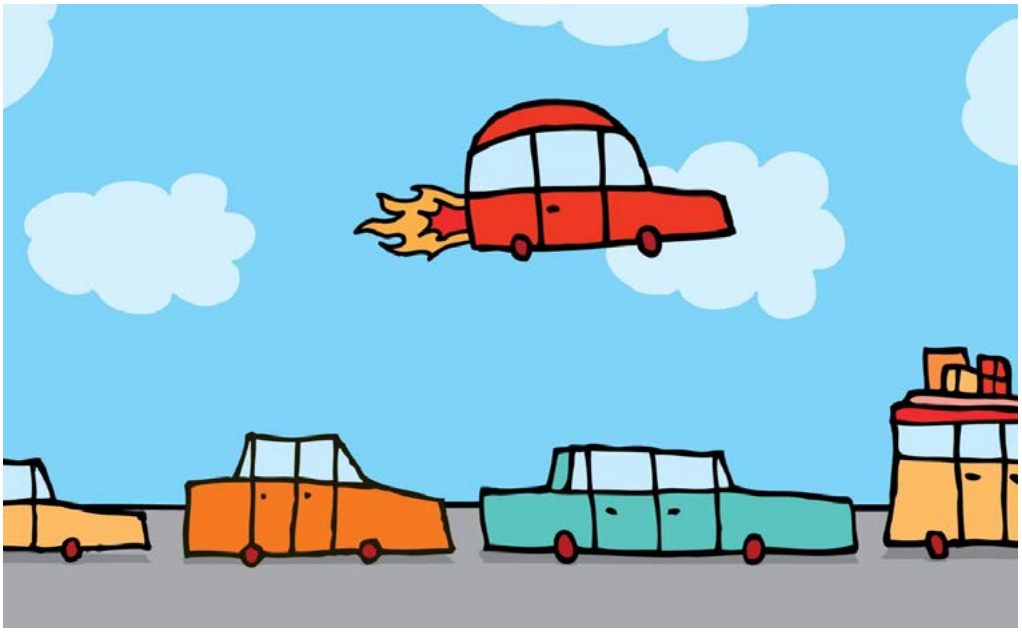


Image: Shutterstock

Flying Cars

In the real world, where are flying cars?

By Bidushi Khadka

Stuck in a long endless traffic jam, have you ever wondered how amazing it would be if only you could fly away to your destination in your car? People have been dreaming about the flying car for a long time now. Since the early 1900s when the Ford Motor company started mass production of cars and Wright brothers flew the first airplane, the concept of flying cars has been a dream. Flying cars have always been an object of fantasy. From 1985's "Back to the Future" to 2002's "Harry Potter" to present day "Agents of Shield", we've seen it in movies, books, and TV series. But in the real world where's our flying car?

A flying car is a personal vehicle that provides door-to-door transportation by both road and air. Since the first years of the twentieth century, many attempts have been made to build a flying car, and though no flying car has yet reached production status, many prototypes have been made and while many failed some have even succeeded. In 1926, Henry Ford displayed an experimental single-seat airplane that he called the sky flivver which was the first attempt to build a flying car. And our flying car has developed a lot since then and every day we are getting closer to flying our own aerodynamic vehicle.

Moulton "Molt" Taylor created perhaps the most well-known and most successful flying car to date- Aerocar. Inspired by The Airphibian and Robert Fulton, the Aerocar was designed to drive, fly and then drive again without interruption. Taylor covered his car with a fiberglass shell. A 10-foot long drive shaft connected the engine to a pusher propeller. It cruised at 120 mph in the air and was the second and last roadable aircraft to receive FAA (Federal Aviation Authority) approval.

In 1970, Ford Motor Co. even considered marketing the vehicle, but the decade's oil crisis dashed those plans.

> "There are still some obstacles to overcome, including receiving approval from the FAA (Federal Aviation Authority), but the cars are close to being finished. After a century's wait, they are finally here. So be prepared, any day now we might see and even fly a flying car."

A practical flying car must be capable of safely taking off, flying in the air and landing in a heavily populated urban environment i.e. vertical takeoff and landing (VTOL). It requires a propulsion system that is quiet, to avoid noise complaints, and has non-exposed rotors so it could be flown safely in urban environments. Many types of aircraft technologies and form factors have been suggested, such as ducted-fan and tiltrotor vehicles. The Wankel engine designed for flying cars replaces pistons with a single triangular rotor spinning inside an oval-shaped chamber, which creates compression and expansion as the rotor turns. There are three combustion chambers in the Wankel, with a crankshaft between them.

Additionally, for the car to become airborne, they would require very powerful engines. It should also be affordable so everyone can use it in their day to day life. Safety is also an important aspect to be considered for every invention. Since learning to drive a car which flies can be unsafe and also a tough job, flying cars are likely to have a fly-by-wire system. This means the car will be completely controlled by computers using Global Positioning System (GPS) and satellites. To prevent frequent accidents due to mechanical failures, cars have been designed in such a way that cars can land even if one of the engines is lost. In case of an accident, the vehicle will release a parachute and airbags, internally and externally, to cushion the impact of the crash.

In the present day, the flying car has already been invented and is further being developed by many companies. The Terrafugia Transition is a two-seater car that can convert from road to air in less than



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a minute, without the driver leaving the vehicle. Fitting into a standard parking space, using regular gasoline, and capable of taking off and landing using any grass strip or paved surface just a few hundred meters long, the AeroMobil 3.0 is a realistic future prohibited by laws. There are still some obstacles to overcome, including receiving approval from the FAA (Federal Aviation Authority), but the cars are close to being finished. After a century's wait, they are finally here. So be prepared, any day now we might see and even fly a flying car. IV

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Sky Flivver

Aero car





Aeromobil

Terrafugia



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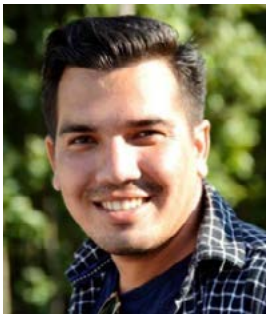
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Expanding and exploring diverse arenas of our fraternity, they are our frontliners expanding the framework beyond physical boundaries.

FACTS
RESEARCH & ANALYTICS

Employment status

(Based on categories of industries)

FY 2071/72



Construction

3,142

Mineral

6,399





Energy based

26,401

Argo & Forestry

32,376





Tourism

49,464

Manufacturing

280,801



Service

104,009





423-07-27-2015 Source: Annual Development Programme

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ENERGY

MAJOR TRANSMISSION LINES AND GENERATING PLANTS (EXISTING AND PROPOSED)



Source: USAID, 2006

83k MW
TOTAL POTENTIAL OF HYDROPOWER

42k MW
ECONOMICALLY VIABLE HYDROPOWER CAPACITY

10k MW
TOTAL NEEDED INSTALLED CAPACITY BY 2030

SOME POTENTIAL GENERATION PROJECTS (200MW+)

S.N.	Project Name	Project Type	Capacity (MW)
1	Kamali Chisapani	Storage	10,800
2	Sun Koshi 2	Storage	1,110
3	Lower Arun	Peaking RoR	650
4	Tamakoshi III	Peaking RoR	650
5	SR-6	Storage	642
6	Sun Koshi 3	Storage	536
7	Peaking RoR	Peaking RoR	500
8	Lower Badigad	Storage	380
9	KR-7	RoR	330
10	Dudh Koshi	Storage	300
11	Madi	Storage	200

AREAS FOR INVESTMENT

HYDROPOWER · SOLAR ENERGY · WIND ENERGY · BIOMASS · GEOTHERMAL



Industrial Problem of Nepal and its Development Perspective

An overview of the country's industrial scenario

By Nitesh Barnawal

Nepal, a least developed land-locked country with a small but open economy had been facing the problems of poverty, marginalization, weak institutional capacities, financial and technical constraints. The population of the country is estimated to be 30 million. Per capita income remains only about US$700. Agriculture accounts for around 38 per cent of GDP and more than 75 per cent of employment generation. Woolen carpets and readymade clothing, noodles, plastic products, vegetable ghee etc are the leading export items constituting about 85 percent of total overseas exports. Other important industrial products are food, beverage and cement production. Tourism contributes about 12 percent of the total foreign exchange. Historically, Nepal hinges upon the foreign aid for its economic development. But because of the lack of infrastructure, small domestic market, and limited natural resources, Nepal's trade deficit is very high and widening rapidly over time. As a developing nation. There are so many development issues entailed to be addressed as far as possible through economic policy measures. High transit costs, absence of basic infrastructures, dependence on traditional technologies etc have left some of Nepal's structural limitations. Industrialization process of Nepal has been barred by the constraints like land-lockedness, high cost of capital, high cost of doing business, high cost of energy, lack of raw materials, lack of skilled manpower, small size of market, and dominance of imported products.

Challenges

Nepal has been emphasizing foreign investment by lifting the control on foreign investment and providing many facilities. The Foreign Investment and Technology Transfer Act 1992 was enacted in line with open and liberal economic policies. The aim of the Act is to attract and bring in foreign investment in the form of equity participation, direct investment in domestic production, reinvestment of the earnings derived from such investment and transfer of technology among others. But Nepal could not attract significant amounts of foreign investments. Traditional attraction i.e. cheap labor is becoming less important in investment decisions in the current world economic order. The country can no longer count on low labor costs alone but also needs high-quality, productive labor to sustain its competitive advantages. Multinational corporations looking to invest not only take for granted the presence of state-of -the art FDI policy frameworks and a range of business facilitation measures but also seek a combination of cost reduction, larger markets, and 'created assets' that can help them maintain a competitive edge. Created assets include communications infrastructure, marketing networks, technology and innovative capacity and thus are critical for enabling firms to maintain their competitiveness in a rapidly changing world. Most of these facilities are lacking in Nepal. The forced closures and threats of closure of companies, including foreign joint ventures, continue to affect the commercial interests of foreign investors in Nepal, deterring future investment in Nepal's economy. This in turn negatively affected the prosperity and opportunity. Moreover, unfavorable labor laws and politicking of industrial sector by the political parties have had very bad impact in growth performance of business and industries over the years.

Potential for Growth

In recent years, wild biological and genetic resources, plants, medicinal herbs such as Yarshagumba, etc. have attained a good market value. The annual income of medicinal herbs is about 10 million US dollars. However, about 90 per cent of the herbs are exported to India at low prices because of absence of processing facilities within the country.

Similarly, the prospects for water resources are enormous but problems in process of executing hydro projects and irrigation are challenging. Nepal's geographical constraint landlocked, poor physical infrastructure and scarcity of resources are the main constraints to tap the immense water resources on its strength. Ironically, only 800MW of hydro power has been generated so far. Burgeoning population pressure, high living standard and industrialization in our country along with our neighbors will be accompanied by a proportionate demand for power in the near future for which Nepal's immense hydro-power could be a remedy. Hence, the idea of sub-regional cooperation between India, China, Pakistan, Bangladesh and Nepal to exploit the rich potential deserves greater attention.

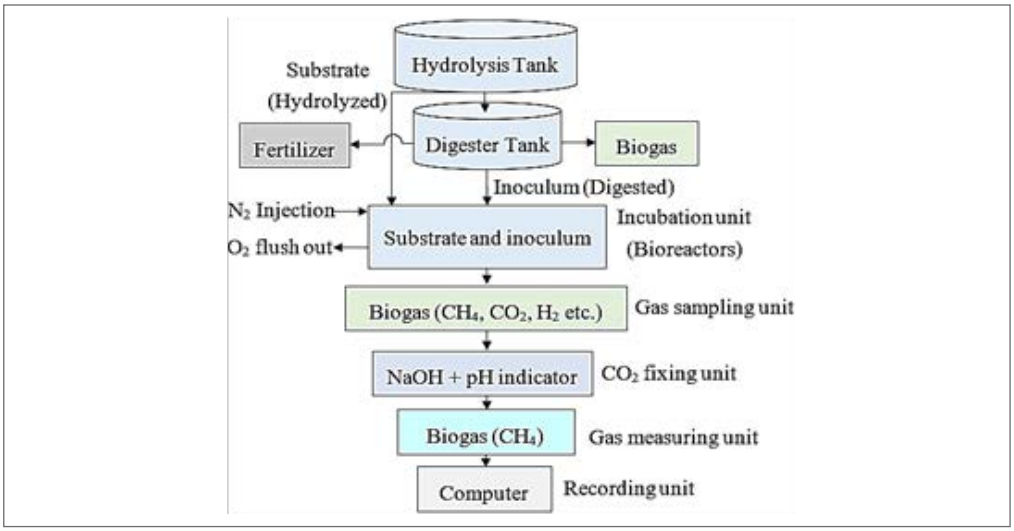
Likewise, Nepal's culture finds expression in a wide variety of forms - religion, art, music, dance and social and religious festivals. There are thousands of temples, shrines and pagodas with intricate woodcarvings and exquisite stone and bronze images. There is scope for development in tourism sector and service industry as well.

Development Perspective

The foreign policy of many smaller states like Nepal is largely motivated by the imperative of economic development. For small states globalization of economy meant there is a reciprocal influence between economy and foreign policy, between foreign policy and society, and between society and political economy in the development processes, producing what Gunnar Myrdal calls "backwash," and Albert O. Hirschman "polarization" effect whereby decision-making and benefits of growth are concentrated in the core. This has undermined the growth process of the periphery. Nepal needs to develop strong political and economic stability to ensure the flows of knowledge, technology and resources with the aim of improving the global standards of living of its entire citizen, including in particular the poorer segments of the country. Globalization should pave the way towards a new era of humanity and civilization with a fair and equitable distribution of welfare. VI



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Influence of Nitrate in Methane Production by Anaerobic Digestion of Food Waste

By Er. Pratap Jung Rai

Introduction

Food waste is rich in organic matter and high moisture content. The anaerobic digestion (AD) technique is assumed to be the cleanest and a more sustainable solution than physicochemical technique (Ariunbaatar, 2014). In AD bioreactors, an optimum range of nitrate addition enhances the biogas (methane) production. To achieve the objective, the work was performed at thermophilic condition (55°C) using AMPTS II (Automatic Methane Potential Test System) bioprocess control.

Methods and Materials

Inoculum and substrate
The hydrolyzed food waste was used as the substrate, taken before come to the digester and digested food waste as inoculum, taken after digester (Figure 1).
Experimental setup
An AMPTS II contains 15 bioreactors of 500 mL volume each. Seven group of tests were conducted: each group consists two parallel bioreactors except blank. IS_5 means bioreactor consists of 5% substrate and 95% inoculum (total volume of each bioreactor contains 400 mL of feed) and IS_N1% means bioreactor contains 7% substrate and 93% inoculum with 1% tCOD equivalent nitrate. Similarly, other groups contain inoculum, substrate and nitrate concentration as a name suggested: IS_7, IS_N2%, IS_N4% and IS_N8%. 1% of tCOD of mixture equals to 5.48 g of tCODx1% = 0.058 g of oxygen i.e. 0.0548 g/2.86 g equals to 0.02 g of nitrate. 80 mL of 3M NaOH with thymolphthalein pH indicator were used as an absorber that absorbs impurities, such CO2, and H2, and only allows methane to pass through the CO2 fixing unit.
Analytical Analysis
The NH4-N, tCOD and sCOD were measured by ion spectrophotometer (UV/VIS Pharo 300). The volatile fatty acid (VFA) and gas composition were determined by using gas chromatograph (GC).
An experiment lasted for 60 days. Bioreactors were stopped to produce methane at 579, 933, 965, 925, 697, and 623 mL for IS_5, IS_7, IS_N1%, IS_N2%, IS_N4% and IS_N8% respectively.

Results and Discussion

The highest amount of methane was produced by IS_N1% and least was IS_N8%. Methane production drops were observed with increase in nitrate concentration (Figure 2).

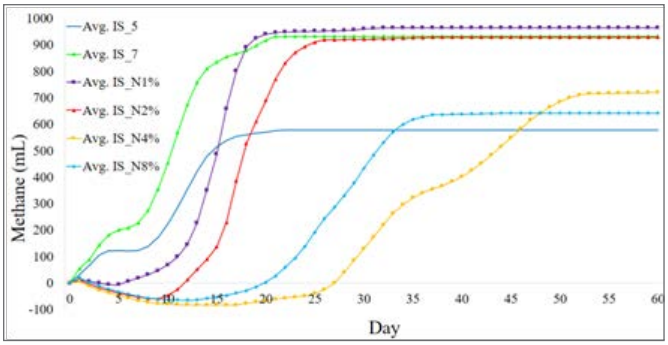


Figure 2. Cumulative methane yield of different samples after subtracting blank sample.

It has been noticed that high amount of nitrate addition might increase ammonia concentration and produce a high amount of nitrogen gas. High concentration of ammonia might inhibit the methanogenesis during the anaerobic digestion process, although it is considered as an important nutrient for the growth of bacteria (Yenigün & Demirel, 2013). Easily digestible organic matters have faster hydrolysis that might initially lead to overproduction of fatty acid and cause inhibition of methanogenesis which could be the reason for the delay in methane production (Brown & Li, 2013). An increase in CO2 content and decrease in CH4 content with the increase in nitrate concentration could be due to the formation of intermediate compounds such as nitrate, N2O, NO and NO2 during denitrification process.

Conclusion

- Delay in methane production increases with increase in nitrate concentration.

- Lower nitrate concentration (<0.43 g/L) had no inhibition effect on methane yield while higher nitrate concentration i.e. above 0.43 g/L caused significant restriction on methanogenesis.
- Highest methane yield of 576 mLCH4/gVSnadded or 458 mLCH4/gCOD was obtained when nitrate concentration was 0.2g/L (1% tCOD) and least was found 375 mLCH4/g



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VS added or 298 mLCH4/ gCOD from 8% nitrate concentration.

•The formation of intermediate compounds such as nitrate, N2O, NO and NO2 during denitrification process and the increase in ammonia concentration due to the increase in nitrate concentration could be expected to have an inhibitory effect on methane yield.

•Higher methane production was observed with increase in the volume of the substrate. IV

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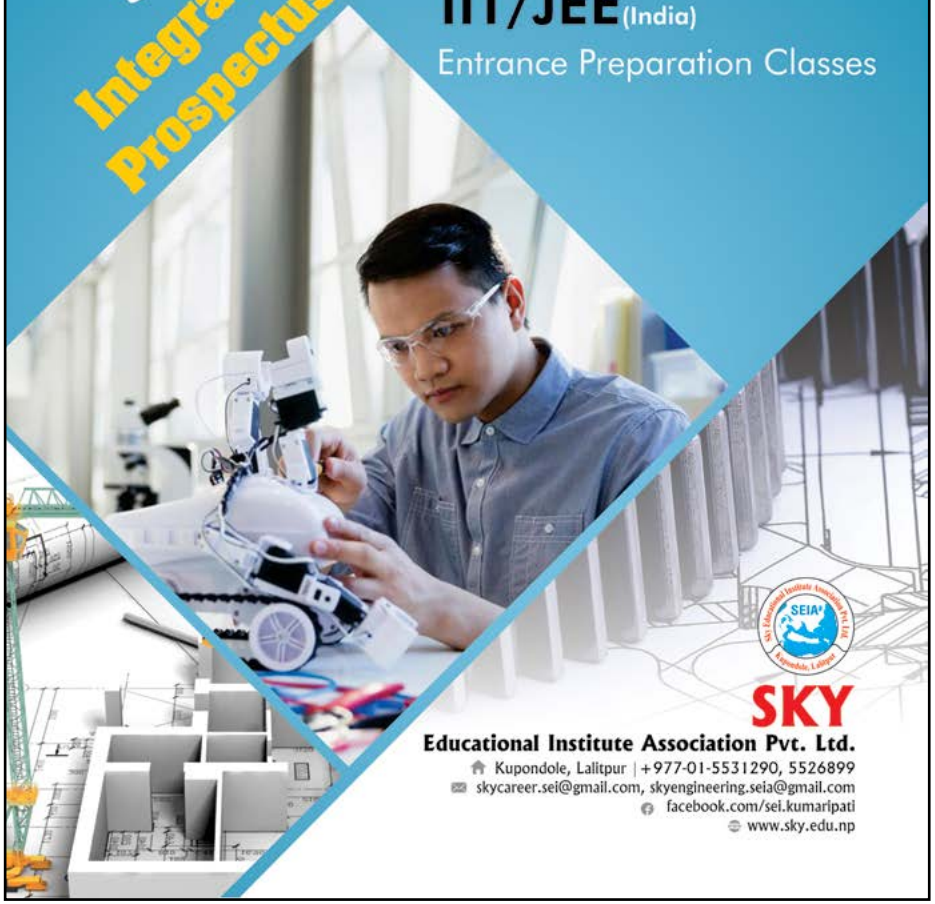
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Hyperloop In A Flash

Isn't it amazing to travel at such high speed and reach the destination like something out of sci-fi movies?

By Suyog Jha

Introduction:

Hyperloop is proposed fifth mode of high speed terrestrial transportation of goods (passengers or freights) in a "capsule or pod" propelled through a narrow pressurized vacuum tube. The term "High speed" would approximately reach the double of the fastest bullet train ever recorded in the history of terrestrial transportation or could lead more than the airline speed .Isn't it amazing to travel at such high speed and reach the destination like something out of sci-fi movies.

But wait, how is it possible to do so?

The answer is quite simple. Physic 101. Reduced friction increases the speed and the key ingredient of hyperloop is maximum reduced friction. And how is it able to do that?? We know that the more the surface contact, more is the friction between them. Hyperloop will have ability to keep almost no surface contact during the motion that is; the pod would accelerate to cruising speed gradually using linear electric motors and glide over the track using the passive magnetic levitation or the air bearings throughout the journey. The air resistance is overcome by reduced pressure inside the tube .Concept of high speed travelling in a pod through the vacuum tubes was a fantasy to many and decades of research was dedicated to it.

The Breakthrough:

Finally in 2012 Elon Musk came up with an idea to possibly make things work with hyperloop. The outline of the original Hyperloop concept was made public with the release of a preliminary design. It included a suggested route running from the Los Angeles region to the San Francisco Bay Area. Preliminary analysis indicated that such a route might obtain an expected journey time of 35 minutes, meaning that passengers would travel the 350-mile (560 km) route at an average speed of around 600 mph (970 km/h), with a top speed of 760 mph (1,200 km/h) which simply put is very fast. In 2013 a group of engineers from Tesla and SpaceX worked on the conceptual modeling of the hyperloop. Musk also invited feedbacks from the engineers all over the world to improve it and hence it was further announced as an open source design.

> "Hyperloop unlocks the door to another generation in science. Who knows some day we might be able to teleport from one place to another in flick of a time."

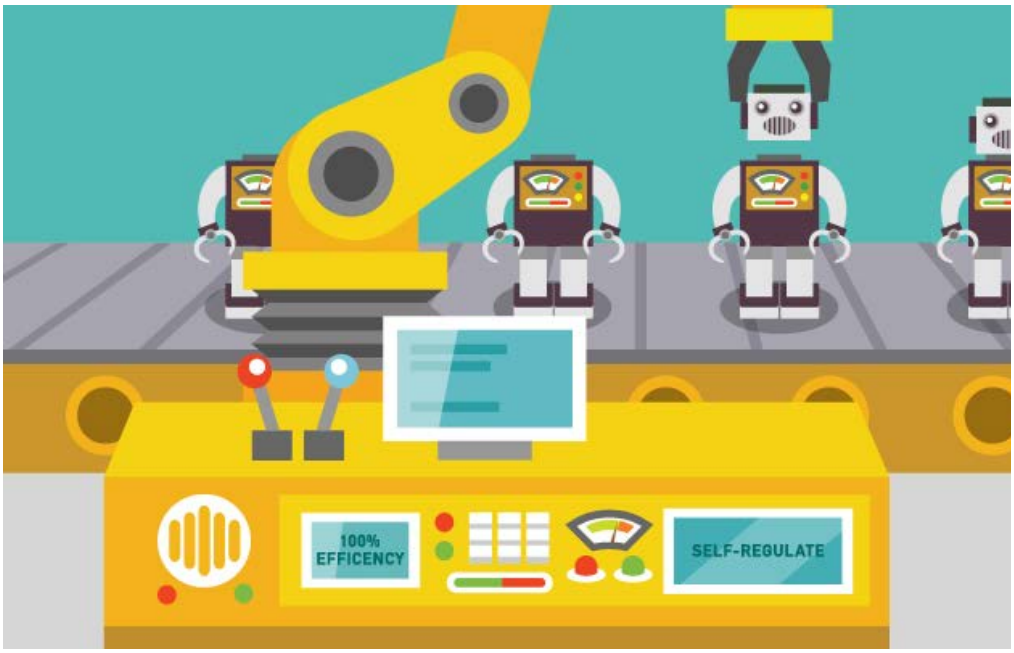
Numerous engineers have been working to develop the hyperloop with effective and efficient design of it. "Hyperloop One" is startups with a team of dedicated 200 engineers have been working to bring the transportation system to market. MIT hyperloop team developed the first hyperloop pod prototype which was exhibited in MIT museum in May 13, 2016. It was based on electrodynamic suspension for levitation and used eddy current braking.

The Future of Hyperloop

SpaceX has announced to sponsor and has also built a mile long hyperloop track for subscale testing near the SpaceX headquarters. Just one year after winning the hyperloop pod competition, the MIT hyperloop pod demonstrated the first ever low pressure hyperloop test run in the world .Different competitions are being organized all over the world for more better industrial designs of hyperloop with improved functionality and flexibility. Not only the speed as the unique factor, some also use renewable energy resources as powering source such as solar power, wind energy, regenerative breaking making it eco-friendly ,a prior agenda with different transportation mediums in the world. Hyperloop unlocks the door to another generation in science. Who knows some day we might be able to teleport from one place to another in flick of a time. IV



Suyog Jha is a second year student of Industrial Engineering at Institute of Engineering, Thapathali Campus.. He can be reached at jhasuyog12@gmail.com.



Smart Technology And Industry

The change has begun.

By Nalisha Thakuri

Smart technology is blurring the boundaries between digital and physical world. Smarter production methods are taking over the traditional ones. The smart industry has made our human life easier and advanced and this is based on the cyber-physical production system that combines communication, IT, data and the physical element. Industrial developments and advancements are now one of the most talked and concerned parts of the world's business and technology. The history of industrial production and manufacturing process and the new integrated smart technology in different machines and industries should be known for the future development of the industry.

History of industrial production and manufacturing process

The industrial revolution brought a change in the way goods are manufactured. Instead of manufacturing items by hand at home manufacturing began using machines to produce multiple quantities in less time. Industrialization marked a shift to powered special purpose machinery factory and mass production. The history started as:
18th century - Industry 1.0: mechanical production powered by water and steam.

20th century – Industry 2.0: mass production based on the division of labor and powered by the electrical energy.

70s - Industry 3.0: Electronics and IT for a further automation of production.

> "Industrial developments and advancements are now one of the most talked and concerned parts of the world's business and technology."

Today - Industry 4.0: Cyber-physical production system.

Smarter technologies are now used for the industrial uplift and large production of goods at a limited time with increased efficiency and precision that is beyond human comprehensive capability. A controlled circuit, microprocessor, PLC (Program Logic Controller) and PCs are used at today's machines. Smart machines of today include either protagonist or diagnostic capabilities, where machines programming interfaces with sensors and can display messages providing guidance to people for what repair maintenance is required. For example hydraulics industry has entered the smarter machine movement because it has reduced energy consumption, has developed control system.

Digital industry

The digital industry is a new term to describe a wide range of work in information technology, computer programming, software development, high tech electronics, information system and web games, and multimedia development. Digital Industry has been playing a vital role to simplify the industrial manufacturing and production using cloud computing with the series of smart equipment providing or feeding the necessary data to the operator.

During the information age, the phenomenon is that the digital industry creates a knowledge-based society surrounded by a high-tech global economy that spans over its influences on how the manufacturing through it and the services sector operate in an efficient and convenient way.



Nalisha Thakuri is a first year student of industrial engineering at Institute of Engineering, Thapathali Campus. She can be reached at nalishathakuri@gmail.com.

Future factories and their frameworks

The trend of the ever changing intelligent machine will only continue. As customers seek better controls, longer lasting components, easier and reduced maintenance and improved efficiency, machines will push ahead into new forms of intelligence. Efficiency has been a particular challenge for the hydraulics industry. While the products are robust and reliable, with high power density, efficiency improvements have not come as easily when compared to alternative power sources. Smarter components and system configurations have made strides in this area, and as new features are created and new integration possible, the conversation may change around the efficiency of hydraulics. So far, the industry is watching this play out in variable frequency drive technology, where a variable speed electric motor, rather than a fixed motor, drives hydraulic pumps to increase industrial equipment efficiency.

Prognostic and diagnostic capabilities will advance as well, though it is difficult to see where they will go and how far. Communicating this information is a key as well, and wireless communication will take on a larger role. The industry is moving towards this technology now, and the trend will grow. With the capability to wirelessly share information from an industrial machine, the right people can be alerted immediately to an issue, rather than needing to go through the protocols of the hard wired systems.

Challenges in integration of system

Development is a slow process. As we move forward the pace decreases. The more advancement the more difficult it will be to implement. The execution problem, high cost for the advanced technologies, skilled manpower maintenance, and the risk of human life can be seen as challenges in integrating such system to complicated process.

Smart Industry Revolutionizing in my community

Panchakanya TMT steel bar which is Nepal first steel industry can be a good example of smart industry revolutionizing our community. It manufactures new generation high strength ribbed reinforcement bar with thermal cooling technology. Thus, with the further human needs, the development and advancements in industrial sector improve with different smart technologies. [IV]



Final Five

With Sashant Pradhan, Business Development Manager
SastoDeal Pvt. Ltd

Sashant Pradhan is currently working as a business development manager in SastoDeal Pvt. Ltd, an online shopping company in Nepal. SastoDeal is one of many companies that initiated the trend of online shopping in Nepal. Shashant talks about the ups and downs of digital marketing, its risks and breaking traditional marketing stereotypes while working in the e-commerce business.

"Digital marketing is a booming business. Kaymu, Anthropose, Threadpaints and so many companies are lining up in the e-commerce business. If focusing on logistics and online payment system, which are currently major constraints, the future of digital marketing is bright and can extend all over the country."

Risks?

Basically, the major risks initially were the skepticism among the crowds about online shopping as a whole. Customers had major trust issues, preferring traditional shopping to online shopping. It is difficult to change the concept of people towards the norms of online shopping and e-commerce. Most customers are concerned about the warranties and guarantees of the product they buy online. The crowd acceptance was and still is a major risk in digital marketing in Nepal.

The next risk is the logistics of e-commerce as Nepal doesn't have a tech-centered consumer mass who is familiar with ABCs of online shopping. Lack of knowledge, awareness and online payment systems are also major constraints for digital marketing.

Emerging Online Marketing Strategies?

Online marketing strategies are dynamic and with a number of online companies (Kaymu, Threadpaints etc.), it is important to establish customer loyalty. The first basic is reaching the customers. SastoDeal currently has an official website, a Facebook page, and its own app.

Since 80-90% customers use our website, Search Engine Optimization serves as the best marketing strategy for our company. Our team of SEOs keeps us running in the front line with our competitors.

Content marketing is also a key marketing strategy we use. Content marketing generates interest among the customers about the products via social media. It has helped online companies to improve the brand profile and online reputation. It is major strategy currently used to boost sales and influence consumer behavior.

Paid search marketing and other strategies like sales, coupons etc. are also used by our marketing team. Many online companies are focusing on marketing strategies to stay ahead.

Dos and Don'ts of Digital Marketing

- Do's

• Ensure Consumer Satisfaction (Customer always comes first)
• Identify your prospects: Know the target customers for individual products
• Post original content (valuable and relevant content of products)

- Don'ts

• Never compromise with quality of products you are marketing
• Don't spam: Don't hit social media feeds every few minutes but be consistent
• Don't just sell, always strategize

How is your company leading the market?

Getting best deals for a reasonable price! Our research and product team are always working on managing best deals for customers and vendors. We try to provide best shopping experience online. Selling Nepali brands at reasonable price has a great impact. Like the Goldstar shoes revolution. People loved the made in Nepal shoes as they were getting the best out of it. Creating a flexible workspace! Since digital marketing requires interactive, dynamic and responsive workplace, we tend to create so. Inclusive workspace, senior internship programs, menstrual leaves for women colleagues etc. help create a friendly work atmosphere necessary to stay ahead. We also introduced senior internship so that all age groups get tech savvy and comfortable with the concept of e-commerce.

Engaging consumers! via social media through sales, coupons, vouchers, and other interesting feeds have also helped us get positive response.

Future scope of Digital Marketing

It is a booming business. Kaymu, Anthropose, Threadpaints and so many companies are lining up in the e-commerce business. If focusing on logistics and online payment system, which are currently major constraints, the future of digital marketing is bright and can extend all over the country. IV

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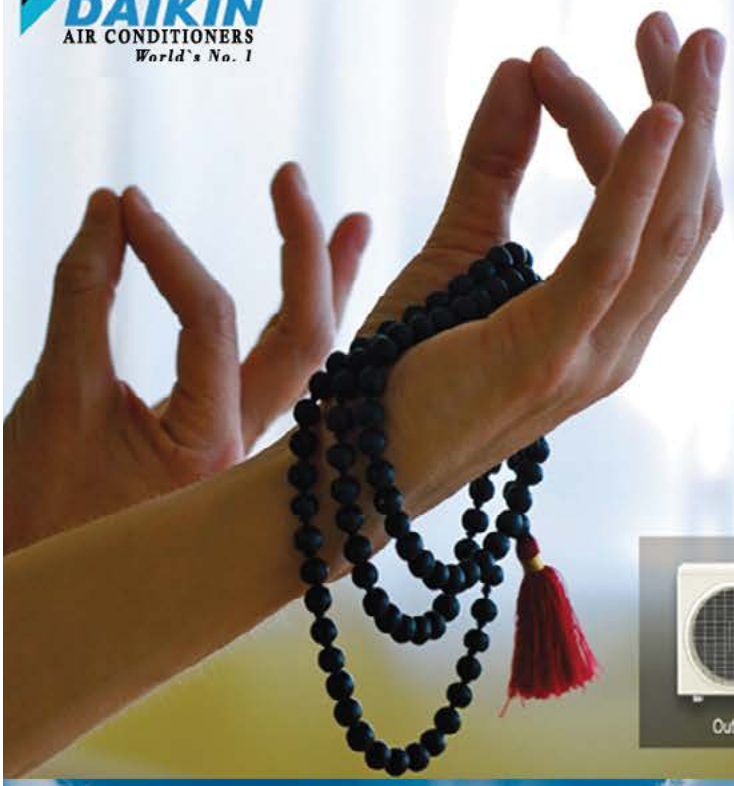
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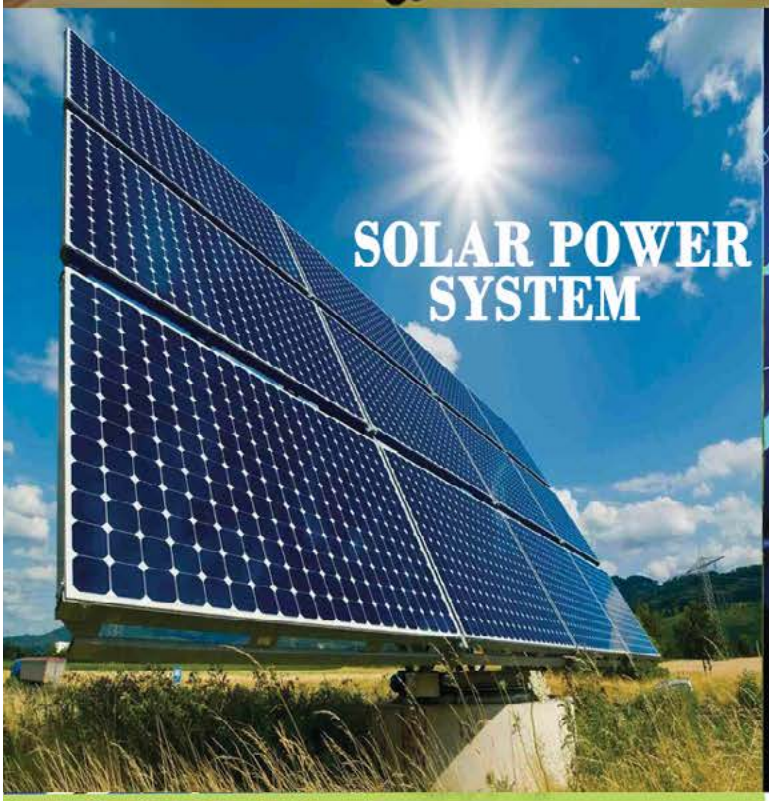


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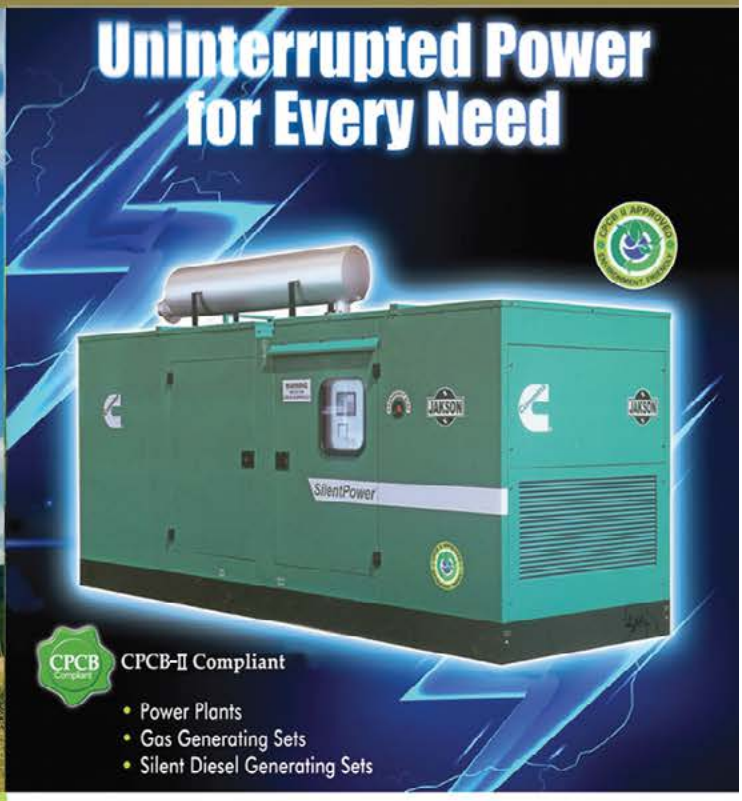
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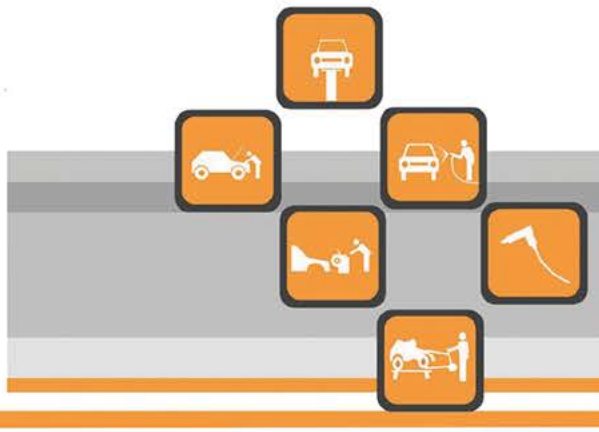
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