University of Texas at Arlington – College of Engineering Commencement Address
Raj Nooyi, UTA MSIE – 1978
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President Karbhari, Dean Crouch, Distinguished Faculty, Parents, Relatives & Friends of the Graduating Class and December 2016 Graduates of the College of Engineering – A Very Good afternoon!

I was deeply humbled and concurrently apprehensive, when a few weeks ago Dean Crouch invited me to speak to you. Humbled, because it is an incredible honor to address a group of very successful fellow Mavericks, on this very important occasion. As for the apprehension, let me elaborate!

You see, Massachusetts Governor John Winthrop addressed Harvard's first commencement in 1642; National Public Radio has an archive of 354 of the best commencement speeches going back to 1774, all of which you have easy access to long after you've recovered from the after-effects of the unrestrained celebration I'm sure most, if not all of you enjoyed, last night; deservedly if I may add. Furthermore, between your parents, professors, advisers and role models you have received all possible needed advice, tuned and metered out when it was needed most. Hopefully, you can now understand my apprehension of having to live up to your expectations of creating and sharing fresh "pearls of wisdom", in this age of easy access to rich pertinent information!

Thankfully, Dean Crouch reset my expectations significantly, and with it lowered my blood pressure, by advising me that the commencement speech is simply an opportunity to share my experience, values and advice. Ladies and Gentlemen, with this threshold of performance firmly established, and hopefully remembered by you all, I venture forth to share my thoughts with you today!

As many of you already know, today we live in an extremely inter-connected world – culture, trends, fashion, research, innovation, products, etc., are all affected by not only what happens in our backyard but beyond it as well. Consequently, anything and everything required of you as engineers in your chosen career will deal with developing solutions relevant to and effectively operating in an inter-connected inter-disciplinary world. To do so well, I strongly believe that **Systems Thinking** needs to

underpin any "Engineering for Human Good", endeavour you undertake. So, what do I mean by "Systems Thinking"?

Gerald M. Weinberg – Manager of Operating Systems Development in Project Mercury at IBM, the project which placed the first American in orbit around the Earth, a visiting Professor in Columbia University, and also the founding member of IEEE Transactions on Software Engineering, defines it as, *"a way of looking at the world. A mental model for characterizing how things in the world interact or are expected to interact with one another. Systems thinking often involves moving from observing events or data, to identifying patterns of behavior over time, to surfacing the underlying structures that drive those events and patterns. By understanding and changing structures that are not serving us well (including our mental models and perceptions), we as engineers can expand the choices available to us and create more satisfying, long-term solutions to chronic problems."*

Take for example, what some might consider the mundane field of supply chain management – a field I've been engaged in for almost 40 years. Not an esoteric field at all – all of you have experienced supply chain management outcomes, even if you are not sure what it entailed. Simply put, it is about making available the right product, in the right quantity, at the right time, to the right person, at the right place, at the right cost. The primary math/science for the tooling – Operations Research, Statistical Theory, Financial Accounting, etc., to enable this objective has been in place for many many years. However, this "simple task" is causing major heartburn for every company in the product business today – when not done right or kept abreast with the times, it is the difference between success and failure; for evidence, just ask any of Amazon's current competitors.

What were once compartmentalized functional tasks optimized locally – e.g., Demand Forecasting, Procurement, Manufacturing, Warehousing and Transportation, are hopelessly ineffective in meeting service level objectives required today, thanks to the inter-connected world we live in today. To be effective and ensure a global optima, they need to be managed as an end-to-end system. However, doing so given the volatility, uncertainty, complexity and ambiguity, in a system with ever increasing clock-speed, requires development and deployment of solutions that segment the problem appropriately, embed the right level of flexibility with affiliated cost trade-offs and activate zero

latency inter-departmental decision-making and corrective action processes, all of which by the way have to evolve rapidly over time. This requires an inter-disciplinary approach to managing the system – components of which include, behavioural science, machine learning, natural language processing, etc., along with traditional math & sciences, while re-thinking organizational structures and their affiliated performance management dynamics.

At the risk of stating the obvious, systems thinking requires deep understanding of the inter-connections that span functional competence, economic trade-offs, scientific & technological capabilities and human & organizational behaviour. Clearly, the better you become at understanding the **System** in your chosen field, the more successful you will be in your chosen career. The good news is that, as engineers you are best trained and suited to practice Systems Thinking. So embrace, practice and excel in *"Systems Thinking"*.

Now, the success you derive from getting good at practicing Systems Thinking is what I'll term as **Professional Success**. This being said, there is another success – a larger success that I ask you to consider, one that is built on the foundation of professional success – what I'll term **Human Success**. Marc Lore, an extremely successful serial entrepreneur in the supply chain arena – known for founding Diapers.com, Soap.com, Jet.com (companies acquired by either Amazon or Walmart for Billions of $$s), said it best when he remarked, "*success is not a measure of your salary, but the impact you have on others and the collective happiness of the people you touch*". This is the success – the *Human Success*, I ask you to aspire for equally and never forget when you are busy achieving your *Professional Success*.

I for one was touched by the success Marc Lore refers to, when in 1977 UTA Profs. Stevens and Dryden, admitted me to the Department of Industrial Engineering Graduate Program with a teaching assistantship. The **Human Success** that was shown me by the residents of Texas and the citizens of the USA through UTA's College of Engineering, forever changed me. It gave me a chance to come to America, build a career as an engineer, start a family and permit me to enjoy the fruits of my labour – a journey that has been incredibly rewarding in more ways than I can enumerate, and for which I am eternally grateful to UTA and to this amazing country, which I now call home.

I don't believe I am off the mark if I were to assert that most of you may be surprised to find that your tuition and fees cover <35%, of the costs required to deliver your UTA education, with the balance being funded by the kindness of others. So, while those like me who received a scholarship can easily identify with the kindness shown to us, it is absolutely true that all UTA graduates benefited significantly from the **Human Success** of Texans.

So then one may ask oneself, why should I be motivated to build **Human Success** other than it being a kind/nice thing to do – perhaps optional, eh? Especially, when as George Saunders' says, *"kindness is hard...not necessarily our default ...kindness comes with age."* For those of you wondering who George Saunders is, he is a famous American writer born in Amarillo, TX and a Professor in Syracuse University. He continues to add, *"Might be a simple matter of attrition: as we get older, we come to see how useless it is to be selfish – how illogical really. The challenge he lays out is, "Don't wait. Speed it along, Start right now".*

Interestingly many independent studies have shown that, "e*ach act of kindness might seem small, but it's actually changing the way we see ourselves, the way we see others, and the way others see us…. In turn, we become a different person – and others notice that. We become more likable, more trusted, and more worthy of helping ourselves, completing the circle of kindness".* Which, by the way, advances and accelerates collaboration, learning and innovation. As these thoughtful insights clearly illustrate, these are skills and relationships essential to being successful in an inter-connected world with clear tangible benefits directly flowing to you.

Taking to heart the advice of Marc Lore and George Saunders – advice that has been validated by many scholars and my personal experience, I exhort you to share your kindness and **Start Right Now**.

In closing, may your **Systems Thinking** power your **Professional Success**, may your **Kindness** nurture your **Human Success** and may your **Aspiration** motivate you to **Start Right Now**! Congratulations UTA College of Engineering Graduates – Class of December 2016!