**Slide 1 (Overview)**

Hi Everybody, my name is Gabriel Hogan and Jenny McManis has asked me to give a talk on ICT from an Industry perspective. So bear with me, as it’s the first time that I have done this in a lecture environment.

If you have any questions jump straight in but before I start I want to go around the room a little bit and find out who people are and what their context is and what their experience of industry or business is.

*Introductions*

**Slide 2 (Title):**

**Slide 3**

What I really want to do is start with a brief exploration of technological revolutions and what they mean. From the research it is seen that there have been five technological revolutions in the recent 240 years and I’m briefly going to go through each of them in turn because they are quite interesting and they start us on the path of a journey.

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The first one is the **industrial** revolution, and what it did for people in taking them from an agricultural background into a new industrial setting. It encouraged migration from rural areas to urban towns and cities. This didn’t happen everywhere at once. It happened in different places at different times and in fact in some places in the world it is still going on today.

**Slide 5**

Next was the **Steam, Coal, Iron and Railways** revolution. This was the beginning of the transport infrastructure being put in place. People started to travel more and it opened up opportunities in locations other than where people were born and raised.

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Then **Steel & Heavy Engineering**, followed by

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**Automobile, Oil and Mass Production**...

These last two are technological revolutions whose effects are still being felt today and some opinions have it that we are at the tail end of this particular revolution. We are all intimately familiar with this areas particularly the use of Mass Production in the consumer lead society.

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Finally the **ICT** revolution. Many commentators and observers in industry and business see this as a real change. But this change is also acknowledged when you go and talk to the sociologists, psychologists and behavioural scientists. We are in the midst of a new revolution and this is important to acknowledge because it has an effect on the way we approach and the way we do business and also the way that businesses which are part of this ICT revolution change the way they work in order to try and grab a portion of profit and market share. (i.e. it educates us to look to past revolution experiences to identify opportunities.)

**Slide 9**

When I say *‘ICT’* what does it mean to you?

*Question session (08:30.19 – 09:14.12)*

This is just a snapshop wordcloud of a twitter feed on a particular day at a particular time showing what the most talked about aspect of ICT is and you can the different aspects there. ICT means different things to different people.

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For somebody with an engineering background it might mean “*engineering systems”*.

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From a slightly different background it might mean “*programming”.* Your perspective is all important

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And what’s even more important is that on a daily basis this view changes and you can have new perspectives. So there is no specific meaning to ICT, it is a conglomeration of perspectives which have different aspects depending on the way that we use it.

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Some people imagine ICT as large server farms or data warehouses

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Other people think of the telecommunications infrastructure itself and the technologies involved there.

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Still more think of the PC and different aspects of that i.e. at server, laptop and notebook levels.

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Even down to tablet (iPad), smartphone etc as consumer items such as the iPod all as being part of the ICT industry. ICT is a wide industry, dispersed and diverse.

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This is the way I think of ICT. This is the original model, the original phone. Two tin cans and a piece of string. A message goes in one end and out the other. The rest is just technology, just a more complicated means of delivering that message, the original idea remains. And what is communication? Communication is messages going in both directions that can be understood by the receiver. The information is the message in one direction, the communication is the (duplex) conversation and the technology in this case is a ver simple case of two cans and a piece of string. If you think I am over simplifying this, when you talk to the big industry players in the telecommunications market, be it Huawei, ZTE, Ericsson etc what are they concerned about now? They are talking about the danger for them becoming “*BIT PIPES”*. This (diagram) is a bit pipe, information moves down the connector (string) in either direction, input and output at either end. These big companies see themselves in this context and this is the reality of the situation. The delivery mechanism has become more complex. The technology whether it is wired, optical or wireless, WiFi, mobile, it doesn’t really matter, essentially it is the same model.

**Slide 18**

RSA Animate:

[**RSA Animate** - Changing Education Paradigms - YouTube](https://www.google.ie/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&sqi=2&ved=0CEYQtwIwAg&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DzDZFcDGpL4U&ei=ySyCUbrZBe2f7ga12oE4&usg=AFQjCNE2YUdOKQZgjKG87ORQlXkfclV5Ww&sig2=TKuotMgQWJCj6RpIFlu3pA&bvm=bv.45921128,d.ZGU)

(What does it all mean?) (The pace of change of ICT and the opportunity for improvement)

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At the end of the day this is what is important, its about people, its about technology enabling people to communicate with each other and if we go back to our different revolutions (**slides 20-23**) what was the result of these revolutions? What do revolutions do? They change the *behaviour* of Society. Society is not the same now as it was before…

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(Tee up to how things can change over time and prompting the ambition of Engineers to make those changes.)

Anyone listen to the radio during the week? What was one of the big news items this week? [Holds up mobile phone] This was forty years old this week. Forty years ago the first mobile phone call was made. Forty years ago probably seems like a very long time but in reality it isn’t that long ago. Before that there was no mobile. If you wanted to communicate you wrote on paper, put it in an envelope and put a stamp on it and sent it away. Or, you went to wherever there was a telephone which was wire connected to another telephone through an exchange which may have been automated or manual. So if we look at what our behaviour is now compared to what it was then, it is completely different. Now, we’re always connected, through our mobile phones. We can even get our emails at 3am in the morning. Our behaviour has changed and this is important from an industry point of view because businesses are struggling to understand what the changes in society behaviour are. They talk about it in a slightly different context. They say “What is the change in behaviour in the Market?” but it’s the same thing. They seek to understand how people change their behaviour so that they can see where there is an opportunity to be able to sell them something whether a service or a product.

The ICT revolution has had a huge impact on our lives and as a consequence lots of companies have come and gone in the last 40 years. The first mobile phone call was made by the Chief Research Engineer at Motorola to his counterpart in AT&T. He made the phone call to make the point of “We did it before you!” But where is Motorola now? Part of it (their IPR portfolio) is owned by Google who didn’t exist when Motorola made this call! Different parts have been sold off to different companies. Essentially it doesn’t exist anymore. Where is AT&T now? It is still there and still one of the biggest telecommunications companies in the United States although huge chunks of it were broken off by the American government and sold to competing companies to prevent AT&T becoming a monopoly.

In 1996, which is 17 years ago, research engineers in Ericsson in Sweden used a control channel on the mobile network to send a 100 bit message. This was the first SMS message. Why did they do it? They did it because they wanted to be able to manipulate the mobile base station itself using the control channel. They didn’t want this to be on the user channel, they also didn’t appreciate that this could be sold as a service. SMS is now a very large portion of operators’ revenues worldwide. When we talk about behaviours, younger people send more SMS messages rather than making voice calls. This has huge implications not only for revenue stream management but also for the way that operators set up their networks. Operators have to deploy and configure their networks optimised for their service mix, so that you can provision for the different services being offered. For instance, if you take Vodafone in the UK 70% of all its traffic is voice while 80% of all the traffic carried by 3 in the UK is data. The configurations for these two networks are completely different. This has huge ramifications for operations management and operational expenditure (OPEX).

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[TED Talk 200 year plan](http://www.ted.com/talks/raghava_kk_what_s_your_200_year_plan.html)

**Slide 26** (Blank)

*Discussion –themes: privacy; new data services; data ownership; cost to consumers; changing offerings, changing business models & revenue profiles;*

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This is an interesting perspective, in this case particular to the iPAD. This is a taxonomy for service types available on the iPad. This is only a snapshot of the services and service types available. The service catagorisation is interesting rather than the example services plugged into each layer. When you buy an app from the app store not all of the revenue goes to the producer of the service. Apple takes approximately 30% of the revenue from each app as a service charge for the use of their appstore and the framework it provides. Ranking is provided by users. Apple provide and maintain a high degree of control over security security and app integrity as part of the service. Apple provides a storefront and they generate a considerable degree of revenue from this service.

When we look at the app types and categories, the interesting aspect is that they are reflective of the user behaviour. These catagories change over time as the group of users change and this picture represents an initial picture at the beginning of the ICT revolution. The first mobile phone call was made 40 years ago, the first SMS 17 years ago. If we project forward the same amount of time, 17 years or 40 years into the future what are the services that will be available to people. This is why the approach taken by the presenter of the TED Talk is important. ICT professionals have to be able to imagine the future in order to create it. The concept for the mobile phone came from science fiction – the Star Trek communicator.

More companies are recognising that this quality or capability of imagination is important as they seek to be able to capture / and invent new markets. There is increasing demand from companies for flexible and capable people who can be productive in a number of areas with different skills and knowledge required.

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Cloud is a new technology underpinned by web access. Clouds ambition is to allow users to access whatever service they want with just an internet connection. However if you don’t have a connection then you don’t have the infrastructure to acces these services. Many of the business models being put forward cloud services are similar to the business models which were used for mainframe access a number of decades ago. Sometimes the resuse of ideas with a new technology can give considerable benefits. Issues such as data integrity, trust, access and security are issues which have been overcome in other scenarios i.e. outsourcing and the models from this business are being reused in cloud. Having said that, there are lots of opportunities for new business model concepts. Because of the newness there are advantages to being small and agile in competition with the larger established product and service based companies. Lots of new small companies are emerging similar to the app market providing new capability based on cloud technology. The newness of the market create parity of opportunity.

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Yet even with cloud the tin can and string model still remains valid. ICT can be as simple or a complex as necessary to provide the required functionality.

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Visions of the future don’t always come out in reality. However it is up to the new generation of Engineers, researchers and scientists to change the behaviour of the world with new visions of technologies, enabling new business and markets to emerge that we have not yet though of.

There are already new opportunities emerging in terms of clean ICT with reduced energy footprints not only at individual device level but also at the overall ICT ecosystem levels.

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