AI in Marketing

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Week 6

Lec 27-Understanding Networks and Brand Network Effect

Welcome to this NPTEL online certification course on Artificial Intelligence and Marketing. And now we will talk about module 27. So, as you can see from this slide, we are talking about understanding networks and then we will talk about brand network effect. So, this is module 27 and these are the things that we will cover in this module. So, we will start with understanding network and network effects for brands and then we will explore the different types of networks and then understand pure hybrid media marketplace and independent networks. Thereafter, we will understand effects of networks in providing customer value at scale.

So, network and network effects. So, as you can see from this utopian proverb, when spiders unite, they can tie down a lion. So, this is a network. The four technology companies Facebook, Amazon, Netflix and Google were referred to as FANG stocks in 2011 by the TV investing pundit Jim Carmer because they had become so big that any major move by any of them directly impacted by the stock markets.

Back in 2013, when the term was first introduced, there were only four companies on the list. Facebook, Amazon, Netflix and Google. Apple was added in 2017. In June 2022, it became MAANG when Facebook stickers changed to meta. BANG stands for meta, formerly Facebook, Amazon, Apple, Netflix, Google that is alphabet.

So, this is the network, Amazon, Netflix, Google and Facebook and then in between came Apple and this become meta, the Facebook become meta. The way the MAANGs and other technology driven companies sell products, services or experiences, theirs or others have also radically impacted the marketer's world because it has completely appended consumer expectations around every facet of their relationship with a brand. So, these tech driven firms are network. The network is a system of interconnected nodes. So, these are interconnected nodes and then they form a network.

A network is a system of interconnected nodes. So, all these they are nodes. A node is an atomic element of the network. Railway systems for example are a network of

individual trail line nodes. Networks have important advantages that force firms to pay attention to them.

The primary advantage is the ability to benefit exponentially from scale that is known as the network effect. So, here the important point is ability to benefit exponentially and not linearly. So, here it is exponent. Over the years, various network pioneers have attempted to model how the growth of a network increases its value. In other words, they tried to describe the power of network effect.

Sarnoff's law. So, now we are talking of network laws. David Sarnoff was a titan of broadcast era radio and TV who led the Radio Corporation of America which created NBC. From 1919 until 1970, it was one of the largest networks in the world. Sarnoff observed that the value of his network seemed to increase in direct proportion to the size of the network.

That is proportional to N, where N is the total number of users on the network. So, more number of users, so the it increases exponentially. As it turned out, Sarnoff's description of network value ended up being an underestimate for some types of networks, although it was an accurate description of broadcast networks with a few central nodes broadcasting to many marginal nodes, a radio or a television audience. Next is Metcalfe’s law. Metcalfe’s law states the value of a communication network grows in proportion to the square of the number of users on the network, that is N to the power 2.

Whereas N is the total number of users on the network. The formulation of this concept, which dates to about 1980, is attributed to Robert Metcalfe who was one of the inventors of the Ethernet standard. Metcalfe's law seems to hold because the number of links between nodes on a network increased mathematically at a rate of N to the power 2, where N is the number of nodes. Although originally formulated to describe communication networks like Ethernet, fax or phone networks, with the arrival of Internet, it has evolved to describe social networks and marketplaces as well. Then comes Reed's law.

Reed's law was published by David P. Reed of MIT in 1999. While Reed acknowledged that many kinds of value grow proportionally to network size and that some grow as a proportion to the square of network size, he suggested that group forming networks that allow for formation of clusters scale value even faster than other networks. Group forming networks according to Reed increase in value at a rate of 2 to the power N, where N is the total number of nodes on the network. The reason why Reed suggested a formula for 2, formula of 2 to the power N instead of N to the power 2

is because the number of possible groups within a network that supports easy group communication is much higher than 1.

So that the total number of connections on the network, the network density is not just a function of the total number of nodes. In reality, it is a function of total number of nodes plus the total number of possible subgroupings or clusters, which scales at a much faster rate with the addition of more users to the network. Since most online networks allow for the formation of clusters, they will likely behave at least somewhat as Reed's law suggested. So this is Sarnoff law. So there are nodes.

This is Metcalfe's law, v is equal to N to the power 2 and this is Reed law, v is equal to 2 to the power N. So now you see that how many different, so these are various clusters that are there. So if you make and sell a tangible product such as a baked goods or tractors through a network such as Amazon, your primary business model is not driven by technology platform that connects you directly with consumers or connect them with each other. Then question is, are you a node or a network? What is a platform? A new business model that uses technology to connect people, organization and resources in an interactive ecosystem in which amazing amount of value can be created and exchanged. The more users participate in a social platform, the more valuable the network becomes to the community.

In this context, Amazon, Facebook, Netflix, Google can also be considered networks that provide value to consumers via the proprietary technology platform such as powered by AI. So these are the examples of networks, Google, Facebook, Uber, Apple, Amazon, Netflix, Airbnb, Zillow. While the examples of nodes are all these product companies Kraft Heinz, Nike, Coca-Cola, Ford, Levi's trade, Tide, Macy's, Rajs Bakery. The networks apart from leveraging a technology platform to provide a product, service or experience to as many consumers as possible. Also collects and analyzes first party consumer data around those offerings, item search, sales, etc, etc.

So that it can learn more about each individual consumer and continuously fine tune that person's experience through personalization. So now what we are trying to do is to learn more about a consumer so that we can get into into some kind of personalization. So networks can also opt to allow other suppliers to connect with their consumers. In this case, the network lets the suppliers use their platform for these transactions and extract a fee from one or both parties for facilitating them. Amazon, eBay and Alibaba are examples of networks that do this.

The inherent ability of the network's technology-driven platform is to collect, process and leverage massive amounts of first party data and use it to provide value to users

through personalization, which is a key component of its ability to create and sustain competitive advantage. So this personalization is the key components of its ability to create and sustain competitive advantage. The first party data available to networks helps them develop product recommendations, promote the right products, develop personalized communications and provide personalized prices. All these personalized marketing strategies are made possible by AI algorithms that are trained constantly from the first party data collected by the networks. The challenge for suppliers, many of whom are nodes, for example, Tide and Coca-Cola is that though they may gain access to buyers on the network platform, they typically are not given access to any data the network collects about individual buying their product.

So the data is with the network and not the nodes. For example, your Coca-Cola, etc. So that is why these networks, they can use this data for the competitive advantage. If the network were to share that information, the supplier might use it to establish a direct relationship with that consumer and potentially take them away by nurturing them directly with personalized offerings so that the consumers begin to buy directly from the suppliers instead of from the network.

So that is the problem. If they start sharing data, then they will get out from in between the in between the node and the customer. Here in the in between there is a network. What are the various types of networks? So one type like YouTube is pure network, Netflix is hybrid network, TikTok is media network and Amazon is marketplace networks. And then this is Starbuck is a independent network. What is a pure network? A pure network's primary business model is that of a marketplace, which provides a technology platform that connects buyers with sellers.

For example, Facebook, Google, etc. in particular, it is subsidiary YouTube. So they are just giving a technology platform for buyers and sellers to come together. Pure networks also have direct connection with customers and enable them to leave and read and read reviews of the products and services. So they connect content creators to YouTube, connects content creators with content consumers and these are the content consumers and these are the content creators.

And sometimes what happens is that the content consumers also become content creator and content creator becomes content consumers. And they all then go through YouTube. Airbnb, Uber, Zylos, StubHub, Haus, ST and LinkedIn also share the characteristics of pure networks. For example, LinkedIn, a B2B network that the reviews take the form of endorsement and recommendations. Airbnb and Uber are pure networks because they do not own anything, but just directly connect consumers to suppliers and sellers.

In the B2B space, LinkedIn provides a platform that ostensibly is designed primarily to connect its members with each other for networking purposes, but also with potential employers and clients. Apple was originally a node, but it joined the network when it created its App Store, which provides a platform for suppliers to offer their products and then enable consumers to purchase, rate and reviews those those products. So Apple was a node, but then with Apple Store, it become a network because now it can bring in lots of lots of people. Some but not all pure networks also sell their own products or are in the process of bringing the ability to sell them to bear these would include Zylos Home, Amazon Essentials, YouTube Original, AirBnB Experiences, LinkedIn Learning and more. These ancillary products represent efforts to increase competitive advantage by acting more like hybrid networks in order to control ever more of the consumer experience.

Next comes the hybrid network. The hybrid network is one in which the pure network business model is connecting consumer and supplier through a technology platform is augmented by the firm also acting as its own supplier. Netflix is a prime example of hybrid network because its business model today is to be a creator, seller and a platform provider rather than sending you to a content creator website or to a channel if you are YouTube to consume the content Netflix own the entire consumer experience from end to end. So they also take TV shows and movies from others and they also produce for themselves. The other thing that makes Netflix unique is its focus on using data to create value for consumers. Netflix knows what each subscriber and subscribers similar to them are watching and so it is able to personalize this offering to a high degree.

There is no direct consumer connection happening at Netflix nor does it provides a place for content creators to sell directly to consumers. So they have to you have to subscribe to Netflix. If Netflix were a pure network its main business would be not commissioning content but encouraging others to post to their content directly on the platform for others to watch. For example, YouTube to that end let us understand this network definition pure versus hybrid by comparing media providers.

Now let us look at the media networks. A media network is a platform that delivers information or data to consumers in the form of shows, movies and videos which can be live or pre-recorded. Media networks are the communication channels used to inter-correct devices that is nodes to a computer network or data communication network. YouTube and Netflix are among the biggest and the best known media networks. But there also are many smaller ones such as Twitch a live streaming platform best known for its gaming content and TikTok the video sharing social networking service. Let us look at the classification of media networks.

A simple classification of media networks is done according to the predominant content type on the network. Some of these media networks can have multiple focuses due to the abundance of diverse content forms. So, one is multiple focused for example Facebook, Google plus, Snapchat. Another is direct chat focused like Facebook messenger, Kick, Peach, Ponder, Snapchat, WeChat, WhatsApp. Third is long form videos Twitch, YouNow, YouTube.

Then the fourth is short form video Snapchat, Vine. Fifth is short form written LinkedIn, Quib and Twitter that is X. Long form written blog like WordPress, Drupal, Wix etc. LinkedIn, Medium, Tumblr.

Then there are some marketplace networks. Marketplace networks connects consumers and suppliers but where possible they also encourage consumers to connect with each other by leaving product reviews. Amazon is for example of it, Alibaba.com, Facebook, Apple's App Store can be all considered as marketplace networks. Etsy, Poshmark and StubHub are also marketplace networks.

Now there are some independent networks. Some nodes also function as independent networks with technology platforms that allow consumers to connect directly with them and with each other through the review process but which do not connect them to the competing brands. For example, the Hotelier, Hilton and Marriott both offer reward programs, Onus and Bonvoy respectively that are connected to smartphones app that allow consumers to do research, bookrooms, checkpoint balances and record their preferences. First party information the Hotler can use not only to better serve the customers but also to inform future business decision about new perks and programs. Another example of a widely successful independent network is Starbucks which is built on its Starbucks reward app. A robust customer data collection machine first deployed in 2010.

Not only does Starbucks have a rich trove of proprietary customer data which they are leveraging to a high degree with the application of AI, they also are working with a partner to monetize this technology and also offer it to other retailers. Now how to go about providing customer value at scale? Since day one, each of these networks have collected petabytes of first party data on their customers that they analyze and process with powerful computer algorithms. This leads to prediction about product or services each customer will want. Prediction about products or services each customer will want sometimes before the customers are even aware that they want them. In effect, networks are able to use data and AI algorithms to personalize marketing.

The result is a powerful AI machine capable of turning massive amounts of first party

data into predictions that networks can use to market effectively to millions of individual segments each containing exactly one person. The ability to do this at scale will lead to a winner take all situation. The more people who join a network, the more information about them and their buying preferences become available and thus the better predictions of AI machines can make about what they want or need at each point in their buying journey. This flywheel phenomena is also called as network effect. Such positive network effects create a snowballing effect that provides lift.

Going back to network effect, Netflix achieved a network effect early on as a DVD only service by inviting users to review movies they watched. However, it was able to achieve a more powerful network effect by shifting the responsibility for evaluating and creating films to its algorithm which was able to deliver deeper, more accurate insights tailored to the individuals. The insights gleaned from data and algorithm based on data drawn from its 192 million plus users make this network increasingly valuable to viewers and allow those at Netflix making decisions about content to see patterns about preferences that would be otherwise opaque. So, that is the beauty of it. Netflix knows what you want to see and that is a great that is a great help in order to come up with the with the type of content that you would like to watch.

As shown in the figure alongside, the value of a network to its consumer increase as more consumers join the platform. So, as you can see on the x axis, there are the number of users moving from 0 to and value provided by users value provided to users by network again it is moving from this to this. So, this is network effect from number of users and increased value from data and algorithm. So, you can see that the network effect from the number of users has increased so much with the help of of of data and algorithm. The higher of the two S shaped graph in the figure represents the incremental value data and algorithms provide consumers in addition to the value provided by just having a large number of users on the network as shown by the lower S shaped graph.

So, when you have only large number of consumers so this is this is the benefit but then with the use of AI the benefits have increased. For example, the value of Facebook for a person increases as more of their friends and family join the network. Also the value of Netflix to a content provider increases as more customers join Netflix. As more content providers join the value of Netflix increases for its users attracting more users to join the network. As more users join the firm can use data about user behavior on its network to develop algorithms which provide personalized recommendation.

So, more number of users will bring in even more will bring in lots of data and this data will bring will will give recommendations and make the experience personalized and this will again bring in more number of users. So, the accuracy of these algorithms and hence

the network's value to a user increases as more users join the network and use its services. So, to conclude we have discussed brand networks and network effect. The more users participate in a social platform the more valuable that network becomes to the community. These networks are powered by AI and other emerging technologies.

We have discussed the five different types of network which are pure, hybrid, media, marketplace and independent networks. Networks are able to use data and AI algorithms to personalized marketing. As the network grows more data is collected by and fed into the algorithms which make them more efficient at predicting consumer behavior. And these are the seven sources from which the material for this module was taken. Thank you.