

GDP INDIVIDUAL REPORT

What is Important for Technology Companies to Make Money?

Shakib-Bin Hamid

Abstract

Gene regulatory [?] is used to perform hybrid modelling of GRN.

The 'Idea'

A technology company starts with an idea, but the idea alone is just part of the puzzle and carries less weight in revenues, profit margins or even valuation than some other concepts like market, protection, growth etc. During a guest lecture Alexander Hill from Senseye put this crucial point across, as did David Parker.

Selling videos has long been a successful business. In fact Blockbuster and HMV were largely successful in doing exactly that. But these companies are now dead [1] or skeletons of their former selves [2]. On the other hand, Netflix and Apple took the same idea with a different delivery medium - streaming content. Youtube is also incredibly successful with the same idea of streaming video, and yet I do not consider Youtube and Netflix to be competitors, since they serve very different purposes - Netflix as a paid service for produced videos, whereas Youtube is an open platform of community content. Given the market dominance of Netflix among its targeted users, one would not expect Amazon, an online retailer, to be a worthy opponent. Yet Amazon Instant video, a business spun from the acquisition of LoveFilm [3], is gearing up for intense fight this year [4] and they are already a competitor to Netflix. But Amazon's success is obviously not in the idea, but in the delivery of its content - through its Prime subscription framework - the Flywheel shown by Ian Gavin, i.e. their retail business, which gets more traffic from the Instant Video customers, drives revenue. The two companies are operating with the same 'idea', but they are both successful because of their business model. On the other hand, Apple, an extremely profitable company and an earlier adopter to the streaming idea than Amazon, is failing to make a measurable dent in the video streaming market, although their iTunes music store is

a market leader. It is because of failing to secure content deals in time [5] and a very narrow delivery route - the iTunes ecosystem, which many associate with Apple devices and do not consider to be a standalone service. Similarly, Vine - a company with an exciting idea and bought by Twitter, is now in ashes [6]. They could not make money from their 'short vlog' idea in the long run, although it was quite popular among the users. Both Apple and Vine had the right 'idea' but their execution has fallen short.

The point to make here is that the 'idea' and acting early on it is surely important - but only if the other parts of the business model is executed well as done by Netflix. It is quite possible to enter a busy market with a largely similar idea and successfully compete with a majority market holder as done by Amazon Instant Video. But the idea alone will not make the business successful as demonstrated by Vine and Apple's iTunes video store.

The Market and Distribution Channel

David Parker put market and delivery as the most important part of a technology business during his guest lecture, as did Ian Gavin. Finding the right audience and delivering the product to them in an efficient and customer-friendly manner is absolutely crucial to the success and survival of a technology company.

Amazon takes pride in their 'One Click' to buy and as short as a two hour delivery service - Prime Now. Amazon's target has always been to work backwards from the customer and drive volume based on customer satisfaction. With that in mind, they are investing billions in huge fulfillment centres and Prime Air this year [7]. Amazon's recent focus on taking control over the logistics is a proof that distribution channels are crucial to their ever growing share in the retail world. They have also realised that their market share

in the US is reaching saturation and are now focusing on Middle East and Asia, evident in the Souq.com acquisition [8] and Prime launch in India [9]. On the other hand, Google has had to create a market for their smartphone business. As the maintainer of the Android project, Google has let companies like Samsung, LG, Sony etc. infiltrate the smartphone market with Android users. Now that the market is ready, Google themselves have entered the market with their premium Pixel devices and marketed them to have the 'best and pure' form of Android, quickly overtaking LG and Sony. However, Apple has taken a drastically different approach to both of these companies. Unlike Amazon that operates on volume and Google that operates largely on ads, Apple has successfully marketed themselves as the de-facto premium 'gadget makers'. They market their product as premium and 'it just works'. Thus Apple has been able to sell millions of expensive iPhones [10], when Amazon's relatively cheap Fire Phone is now a dead product [11], proving that only pricing low may not win the war, while right target audience will always buy the product if they perceive it necessary.

Clearly recognising the right market and generating enough volume through the right distribution channels is crucial for a technology company to make money. All three companies above focus on their core competences, create the market and dominate it through volume, ease of access and perceived quality.

Protection

A technology company must be able to protect its Intellectual Property, e.g. the formula, logo, product design, manufacturing process etc. so that others are not able to take their spot or make competing products. There are some legal procedures - copyright, trademark, patents etc., as well as creating other barriers to competition to achieve this.

Using copyright and registered trademark a company is able to protect their designs. Companies protect their novel approaches to solving a problem using patents. However, as Benjamin Husband put during his guest lecture, all the above requires significant time and money. Specially, patents can take months and once approved they are open for public. Unless the company is ready to litigate infringement, it may be better to keep it a trade secret, e.g. the Coca-Cola formula. Also, a granted patent is only valid where the issuing authority operates. So, to operate in multiple markets around the world, one would require multiple patents and keep them alive. A patent is also sought after to protect own company. Google purchased Motorola in 2012 exactly for this purpose and then sold

the stripped off company to Lenovo [12] so that they could protect Android. There have been numerous lengthy and expensive legal battles over patent infringements, e.g. Apple Inc. v. Samsung Electronics Co [13]. It is clear that these successful companies value their IP in the highest regard. Some like ARM have in fact orchestrated their business model about licensing their IP. For others like Blackberry and Nokia, they have been revived recently because of their IP [14]. Using their protected IP, a company can leverage their relationship with others. For example: recently Imagination Technologies suffered a heavy blow from their lapsed deal with Apple [15]. But their IP gives them a fighting chance to challenge Apple in near future. On the other hand, Non-Practicing Entities like Acaia Research purchases patents and regularly exercises their right to litigate or licence.

The key idea is that, technology companies must protect their IP - through legal process or trade secret. Protection gives them barriers to entry, revenues through licensing, leverage in exit negotiation or even revival as a new entity in case of calamity.

Finance

Alexander Hill received initial funding from a government grant. The founders of Senseye and their relatives also invested their own money. Later a significant customer themselves invested so that the business could progress. They also received funding from angel investors. These are but a few of many ways to finance a technology business.

From the guest lectures I think that a technology company must receive significant funding if it is to protect itself, survive and hopefully succeed. Companies can get loans from banks, but the agile nature of most startup technology companies is, I believe, the largest impediment in this. They can approach angel investors or venture capitalists and all guest lecturers put them forward as a viable option. But it will require a measure of luck and a well-defined business plan. For example: Khan Academy started by an angel investor after a fateful encounter and is currently funded by large investors and donations. It also matters what is offered in return - equity or cash, since equity might be worth a lot more in future (Zappos was acquired by 10m Amazon shares at \$888m [16], value of which has more than doubled in the last year alone). Large technology corporations often raise money using bonds, e.g. Apple recently secured \$10bn by bond sale [17]. One of the most well known ways to raise capital is through going public, starting with an IPO. An IPO requires a significant market attraction to the

company, but it can astronomically raise a technology company's value, as seen in recent trends. For example: Snap has been valued at \$28.3bn [18] amongst concerns from many [19]. But it at least gives Snap a large fund to then put to good use. Crowdfunding has lost some traction recently, but it is still successfully used by many companies, e.g. MacRebur is raising £590,000 by selling a stake on Seedrs [20].

I think that a technology company must investigate multiple sources of funding, as every guest lecturer did for their companies. Grabbing the right opportunity is as crucial here as any bulletproof business plan or engineering. Thus I consider financing to be the most difficult part of running a successful company.

Survival

In order to discuss how technology companies could survive, we need to find examples of companies that have faced disastrous outcomes and investigate the possible causes. Some of these companies have withered away, some survive as a shadow of itself, but some rise as phoenix from its ashes.

Nokia was the world's most prominent telecommunication company, but it failed to compete in the smartphone market with Android and iOS. In fact, every early 'smart mobile OS', Palm, Symbian, Blackberry etc. all crumbled as they tried to hold on to their proprietary technology while Android was free to use by any manufacturer and easier to build ubiquitous applications on. Understandably the market preferred the new Google-backed free OS. Nokia now acts as a supplier of telecommunication technology and the brand lives on with HMD Global. Blackberry detached from RIM and Palm has been bought and sold by HP. Their undoing was failing to project the winning technology and jump at the new opportunity for innovation, and their shadows survive on either brand name or IP value in the company. Nintendo is another example where innovation and calculated risk jump started their dominance. Nintendo 64, Wii, Gameboy, Nintendo DS were released at times where the giant was struggling to keep afloat and the consoles' unconventional innovation and targetted campaign (as 'family entertainment', rather than a 'gamer's dream') made the company a fortune. However, the latest consoles released by Nintendo - Wii U and Switch have been accused of not being suitable for any market. The company finds itself yet again fighting for survival. On the other hand, during the Dot-com bubble Amazon's stock price plunged from \$100 to \$6 and the company not only survived, but now thrives. Some attribute their success to their ability in large investments, the appropriate acquisitions etc. But I think

that Amazon's survival relies on its ability to diversify its business beyond only retail - Amazon Video, AWS, Twitch, Amazon Devices etc. In this scenario I find Apple to be a renegade - a company that relies mostly on expensive in-house technology and a relatively small catalogue. They have beaten the odds by establishing their products as premium and marketing aggressively to the general public. Their survival is based on their customer's perception of their products and their historical profitability. But I fear for the future of a company whose most revenues come from a single product - iPhone.

I believe that a company needs to first discover their core competence and target the suitable market. However, to survive in the long run, they must grow (not be a 'one trick pony'), find a balance between investment and cash, but most importantly - adapt to the changing market.

Conclusion

Biological regulatory networks of any biological problem are very important to study and analyse. GenNet facilitates the user to completely simulate and analyse both qualitative and quantitative behaviours of GRNs.

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