

EXPONENTIAL GOODS

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*Exponential Goods*¹
Every entrepreneur's dream Good...

1. INTRODUCTION

For years, entrepreneurs have struggled and striven to attract customers to their products, build a customer base and foster consumer loyalty. They have spent thousands of dollars on branding, loyalty schemes, advertising, and product development to boost the demand for their goods and services. However, imagine a product that (once supplied) would create its own demand; a good or service that, through its initial consumption, triggers further need and fuels future demand. This is a new concept, and I call it the 'exponential good'.

Every good or service seeks to cater to a want or a need. Wants or needs can be expressed as problems faced by the consumer that are solved using a good or service. For instance, food solves the problem of hunger, jewellery provides for enhancing one's appearance, etc. Therefore, it can be said that most products today seek to fill a void or solve a problem faced by the consumers, thereby manifesting in the form of something that they want or need. Exponential goods differ from other goods because, in their use, they simultaneously add to the problem they initially sought to solve; thereby, fuelling future demand for themselves. By logic, if the problem that sparks consumption keeps growing, the need for the solution increases, causing demand for the exponential good to rise. With increased consumption of the exponential good, the problem continues to grow at a higher rate which boosts

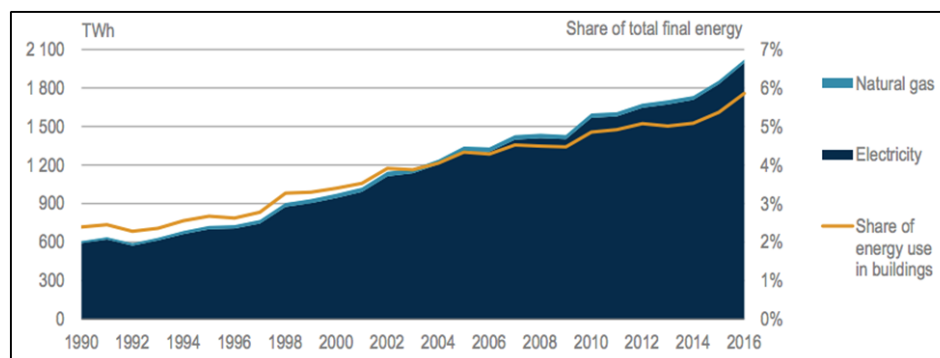
demand and the cycle continues; causing the demand growth curve to resemble an exponential curve.

The hallmark characteristic of an exponential good is its ability to generate recurring demand. Previously, we have seen this phenomenon in habit-forming goods like cigarettes and alcohol. These goods are addictive and affect the consumer in such a manner that the good or service becomes a necessity for them. However, habit-forming goods work on an individual level and not on a mass scale. In other words, consumption of alcohol by one will not change the conditions such that others will also feel an increased necessity to consume it. In contrast to habit-forming goods, exponential goods alter the market conditions such that the overall need or want for consuming that good or service felt by everyone increases. (Market conditions here refer to the reasons for consumption or the primary conditions that spark the need or want, forming the reasons for demanding that good.)

2. THE CASE OF AIR CONDITIONERS

To prove this theory, we consider the case of a good that has become ubiquitous in our urban settings i.e. air conditioners. Air conditioners are built to solve the problem of heat and harsh summers and offer relief by cooling down a closed space. However, their use contributes to global warming by releasing excessive amounts of carbon dioxide and other harmful greenhouse gases like hydrofluorocarbons (HFCs). Statistics and data show that global energy consumption for space cooling has tripled over the last 26 years (Figure 1) from 600 terawatt-hours in 1990

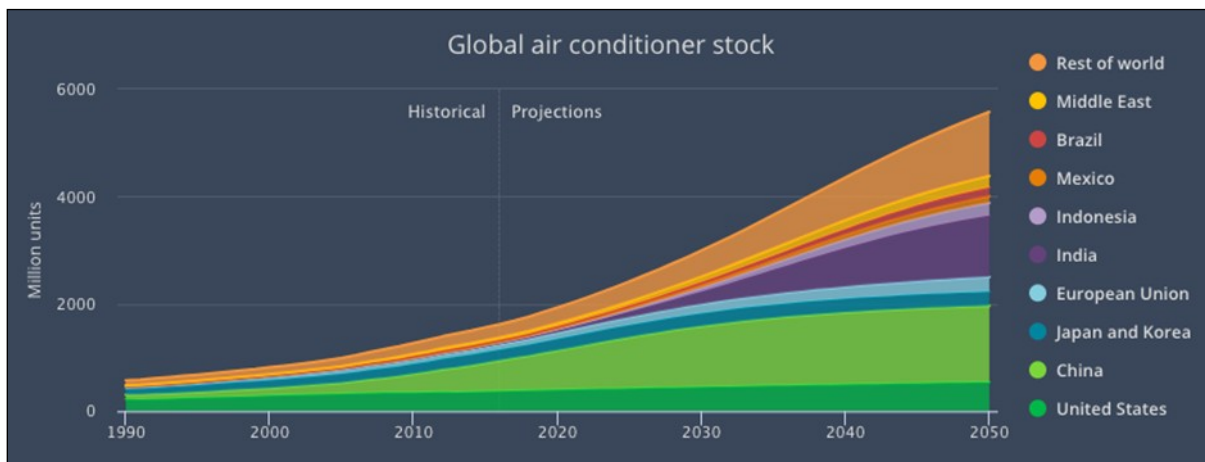
Figure 1: World energy consumption for space cooling in buildings



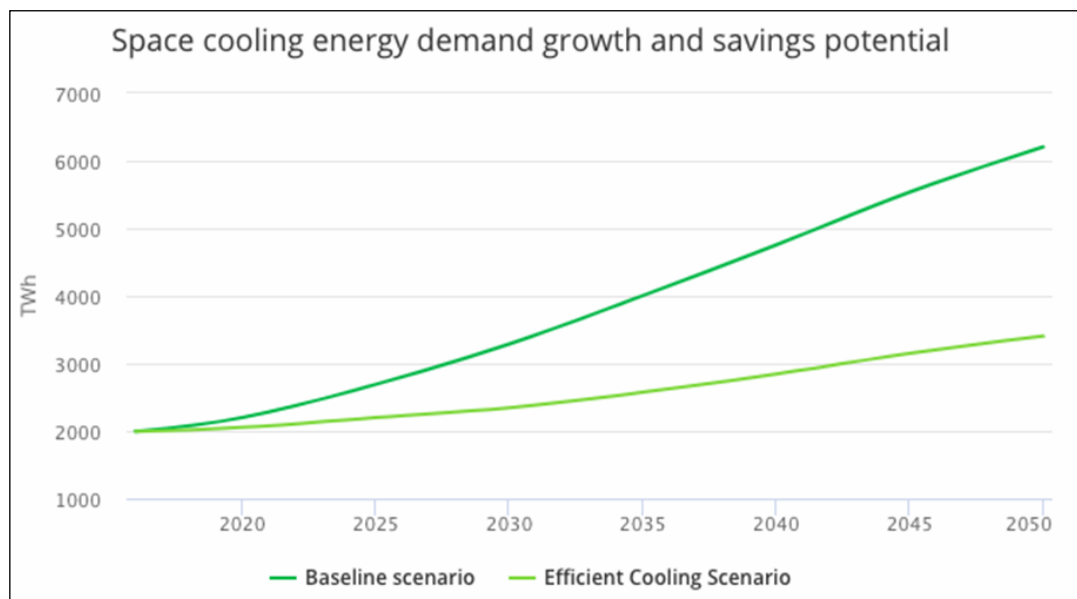
Source: 'The Future of Cooling' report by the IEA

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¹'Goods' in 'Exponential Goods' here and everywhere in this article refer to both goods and services

Figure 2: Units (in millions) of ACs households have stocked over time

Source: 'The Future of Cooling' report by the IEA

Figure 3: Demand growth graph for current cooling technology and efficient cooling technology

Source: 'The Future of Cooling' report by the IEA

to 2000 terawatt-hours in 2016. Households are buying more air conditioners which is leading to a rapid increase in the stock held globally (Figure 2). Hence, it is no surprise that the demand growth curve for air conditioners (Figure 3) closely resembles that of a shallow exponential curve.

The use of air conditioners becomes a vicious cycle, their consumption leads to rising temperatures causing a need for more air conditioners, which results in further temperature rises. Through the example of air conditioners, we can understand the model of exponential goods and their characteristics.

3. CHARACTERISTICS OF EXPONENTIAL GOODS AND THEIR DEMAND MODEL

Problems faced by customers drive them to demand a solution. Like other goods, exponential goods also solve a problem. However, when consumed, they also exacerbate that very problem on a large scale. Thus, with increased consumption, the intensity of the problem faced by everyone increases, which causes them to demand the good further. More consumption leads to greater addition to the problem and hence, further consumption.

Thus, to characterise any good or service as an exponential good, the following conditions are essential:

- i. It must add to the problem it seeks to solve in the process of its consumption.
- ii. The increase in the problem must be felt on a scale larger than the individual so as to create a significant increase in demand.

iii. There should be an absence of alternatives, especially cheaper ones for the demand to continue to rise.

Due to the nature of the product and the consequences of its consumption, the exponential good has an unending demand cycle (except for rare cases, such as when all individuals will possess the good). In terms of magnitude, after its introduction to the market, the graph for demand trends is likely to resemble that of an exponential curve. In other words, after the first sale, over time (regardless of the rate), the demand for the good will grow approximately exponentially.

Such consistent growth in demand should eventually attract new firms to set up and join the promising market. The arrival of new firms will increase supply and prevent prices from rising drastically. Although the actual change in price will depend on the relative rates at which supply and demand are growing, it is likely that with an exponential increase in demand, prices will rise in the very long run.

Necessity is an essential factor in determining the price elasticity of demand for exponential goods. Given that it has the prerequisite characteristic of increasing the need for its consumption over time, we can conclude that the price elasticity of demand for exponential goods will fall, making it more inelastic in nature over time, *ceteris paribus*.

The nature or design of the good are the primary reasons for the continued consumption of an exponential good. Other factors could also drive the consistent and growing demand for it, such as the lack of information about the external costs and benefits of its consumption. If there is an incomplete understanding of the long-term effects of consumption, consumers will become careless and reckless in their purchase and use. Their unawareness of the external costs and benefits propagates their consumption. Another reason for its continued use is when consumers, despite knowing the long-term consequences of consumption, do not regard them as severe enough. In case of external costs, if there is a considerable positive difference between the short-term satisfaction received from the use of the good and the external costs of consumption, then the consumers are again likely to be persistent in their consumption of the exponential good.

Air conditioners are used as an example for understanding exponential goods and their nature. Because of their high external costs on the environment, it is important to explore how to break their increasing demand cycle. Understanding this will shed light on what measures or conditions take away the key properties of exponential goods. We know of information failure as a possible reason for

continued consumption, thus the unending demand cycle can be broken by supplying adequate information. Following the nudge theory put forward by Cass Sunstein and Richard Thaler, we know that giving enough information about long-term consequences outweighing short-term satisfaction will nudge consumers to make wiser choices and reduce consumption of the good with external costs. Active government intervention will be required to eliminate this information failure. Disseminating information about CFC (chlorofluorocarbons) and HFC emissions of air conditioners, to some extent, has made consumers more aware about the impact on the environment and more conscious and careful in their consumption thereby disrupting the continued growth in the demand model.

For exponential goods with external benefits, providing more information about the higher social benefits should boost demand further, according to the nudge theory. People will recognise the real higher merits of consuming the good and will increase their consumption. This should aid the exponential nature of the good's demand growth model.

For goods with external costs, innovation and the presence of better substitutes will cause a massive disruption in the market, just like providing information. Launch of more eco-friendly air conditioners has caused the decline of the old air conditioners market. Thus, the development of alternatives can potentially break the exponential demand trend, especially if they are cheaper to buy. In an oligopolistic market, collusion amongst market players can prevent a situation like this from arising. There will be the risk of new players bringing alternatives since the market will possibly be close to a contestable market. Nevertheless, with collusion, the risk diminishes significantly. In other cases, to be safe, a firm should invest in research and development and find a better alternative to stay competitive in the market and launch it as late as it possibly can to extract the maximum profit out of the exponential good's growing demand. Many firms have started to develop eco-friendly air conditioners as consumers become increasingly aware of their carbon footprints. Such a move will disrupt the market of older and harmful air conditioners, causing it to reach stagnation sooner than it would have otherwise.

4. CONCLUSION

The most important part that distinguishes an exponential good from other goods is that it feeds on its own consumption to fuel future demand by altering external conditions on a large scale, not necessarily physically but even in an intangible way like changing perceptions in society. The altering of external conditions is such that new con-

sumers are attracted in a quicker and more certain way. This saves on a firm's marketing costs and causes it to have consistently increasing demand for a very long time, thereby making its demand growth curve resemble an exponential curve. By no means is it implied that an exponential good would never meet stagnation in sales. But it is clear that the product life cycle will certainly be much longer than usual.

The exponential good is an ideal product for entrepreneurs, a long product life cycle and lasting demand. The product will require an initial push in terms of marketing and advertising to drive sales in the introductory stage of the product life cycle. The marketing costs should fall with time as the good works its charm and creates a mar-

ket for itself. The money saved due to lower marketing costs can be used at later stages for research and development that will help a firm sustain its competitive edge.

The exponential good is like the magic harp that played itself in Jack and the Beanstalk. Just get the harp and let it work its magic. It is a treat for the entrepreneur, saving them the headache of marketing and reducing the risk of falling demand. However, the social implications of such goods are uncertain. By harming the environment, air conditioners have done more damage than good. However, other exponential goods can be socially beneficial. This is an uncharted space in economics, one with a lot more to be discovered. Further research can help provide us with more clarity about this magic harp.

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