



By Ivan Uttley

Thoughts on why businesses need to make decisions on what niche they will occupy and what size of enterprise this requires. Size requires growth and growth has its own demands and consequences too often ignored. The insightful conclusions drawn motivate for the Spark! Methodology built upon the renowned Gazelles Thought Leadership, and discussed in detail in subsequent documents.



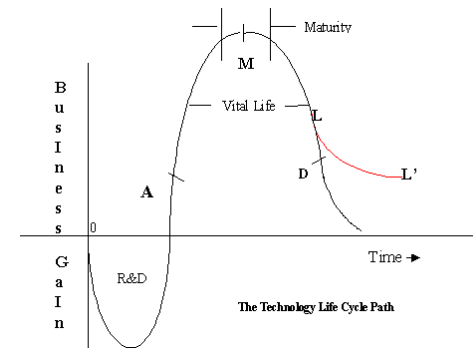
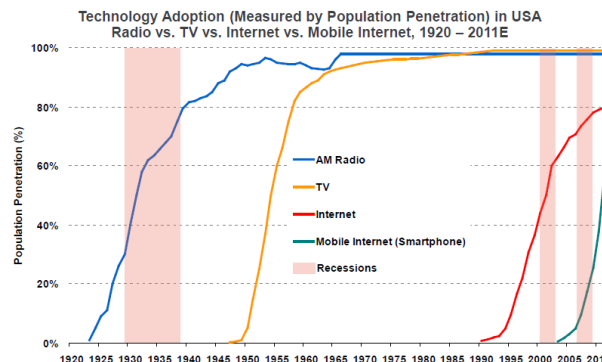
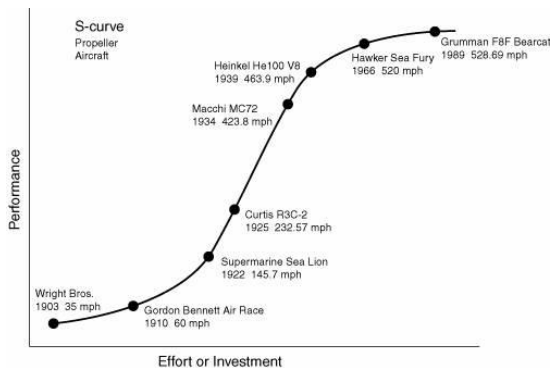
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Consider the ubiquity of the fabled S-curve

The S-curve is found in any activity in which life exists, and is a useful proxy for assessing how the entity, subject or organism is coping with its immediate environment. Through-out nature and the man-made world we cannot help but find the S-curve. We find it in:

- economic trends,
- population growth,
- the growth of cities
- the spread of cancer,
- the adoption of new technology,
- the rate at which humans learn
- and in the life-cycle of businesses



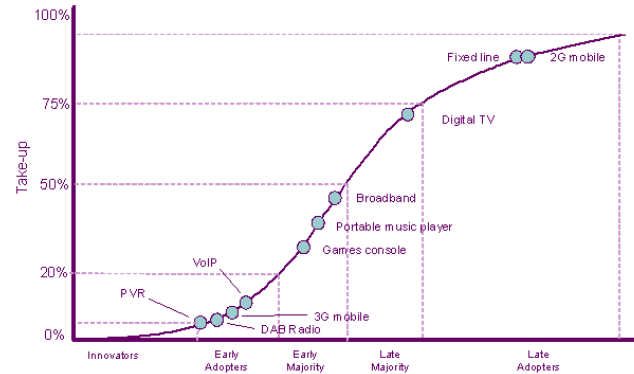
Every business is on some curve, question is what will you do about it?

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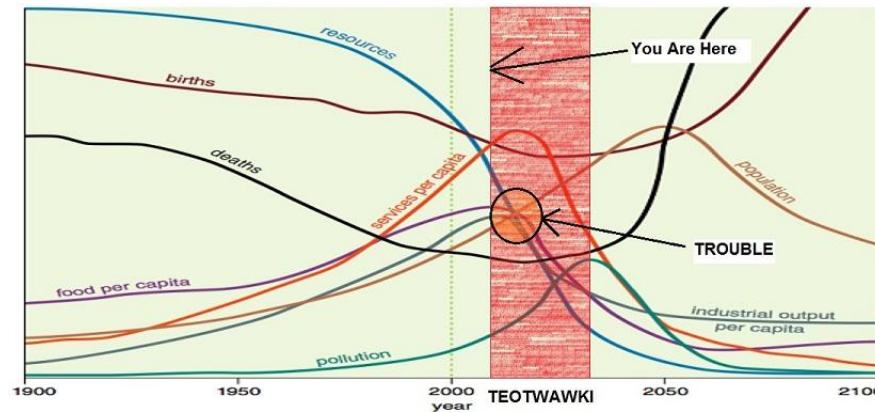


Conventionally it has its uses in marketing and scare mongering, but it has other less well known and better uses.

The S-curve can be translated into useful product penetration and market sizing views.



Or be used as a first order approximation of the future - The end of the world as we know it..showing the limits of growth



But your business ambitions demand more of our thinking!

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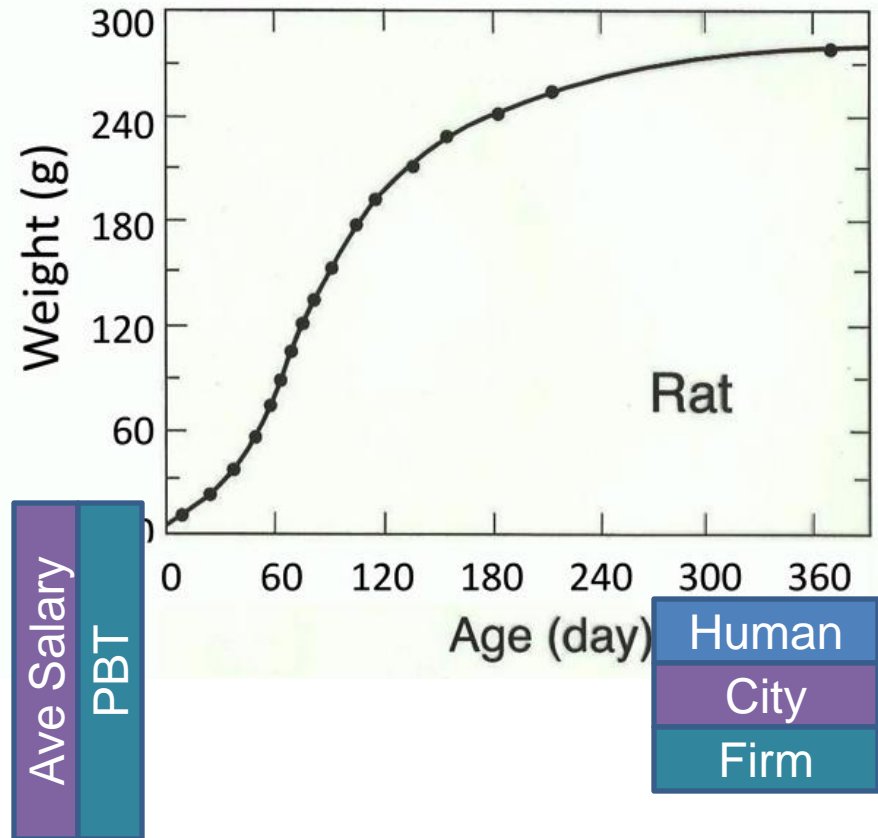


Acknowledging the ubiquity of sigmoid relationships in human endeavors, is there more to learn?

Metaphorically speaking we refer to:

- The DNA of the company
- The culture of the company
- The soul of the organization
- The heartbeat of the city.
- The eco-system of the market

And if we acknowledge that a company is in essence a group of organisms, working collaboratively towards a set of goals, and a city merely a geographical location where organisms gather, then we should pursue the thinking. And as we do, we are led to useful and powerful insights.



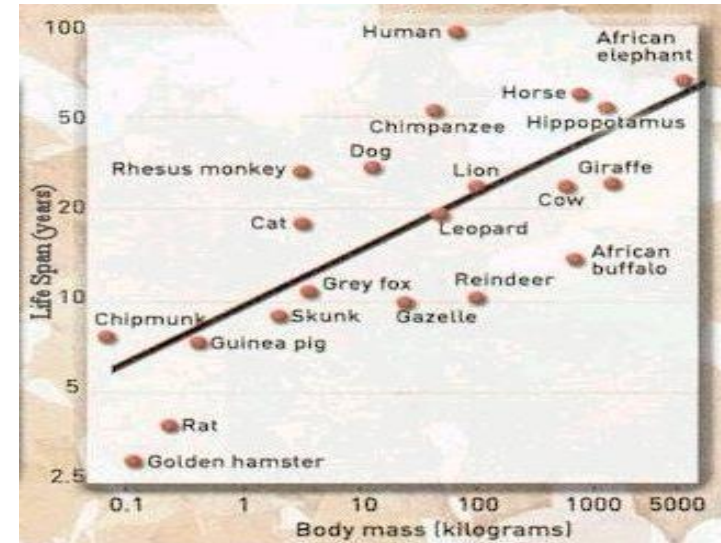
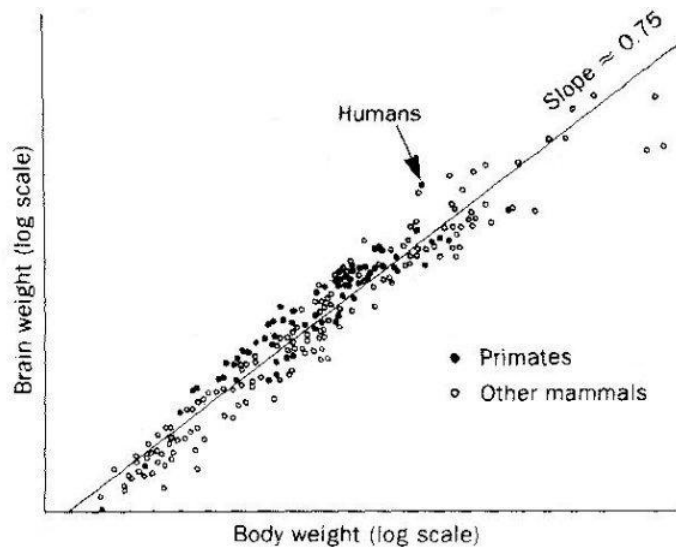
Rats plotted against their increasing weight, the same seems to hold for Cities and Ave Salary, and indeed so too for firms

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Aggregated sets of data are revealing, and reflect the amazing diversity and pervasiveness of life.

Living organisms, governed by the same laws of physics and sharing strikingly similar chemical and biological processes, occupy and thrive in all sorts of niches. Size is not a pre-condition for success, and likewise with companies, not all are meant to evolve into large entities. Nonetheless, what is it that governs this remarkable distribution we see in nature?



Our greatest innovations have at time come from observing the world around us!

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There is an underlying law governing these relationships that drive diversity – scalability!

Biologists are familiar with Kleiber's Law: for the vast majority of animals, an animal's metabolic rate scales to the $\frac{3}{4}$ power of the animal's mass. If q_0 is the animal's metabolic rate, and M the animal's mass, then Kleiber's law states that $q_0 \sim M^{3/4}$. Thus a cat, having a mass 100 times that of a mouse, will have a metabolic consumption roughly 32 times greater than that of a mouse. A clear economy from scale!

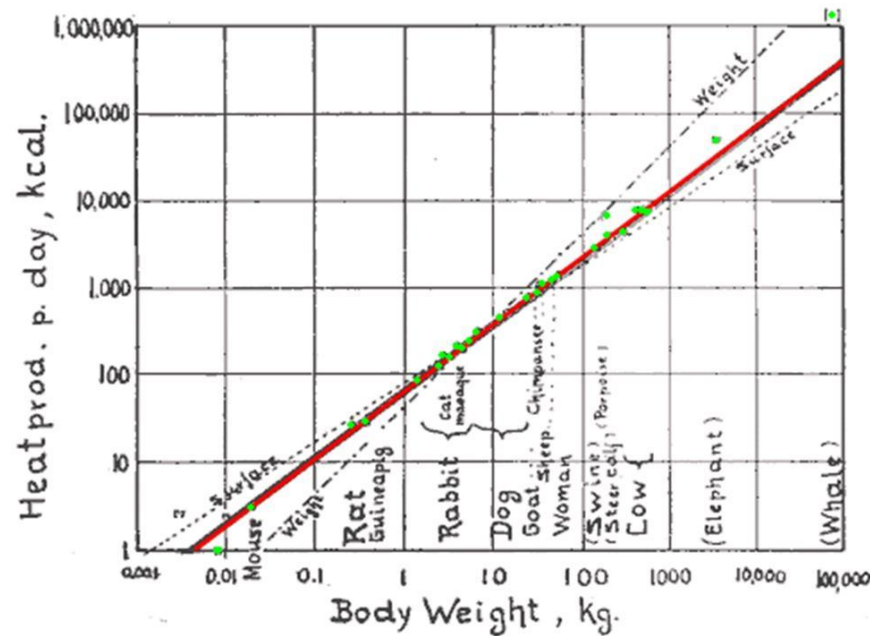


Fig. 1. Log. metabol. rate/log body weight

The gradient or slope of this distribution governs the size which can be attained.

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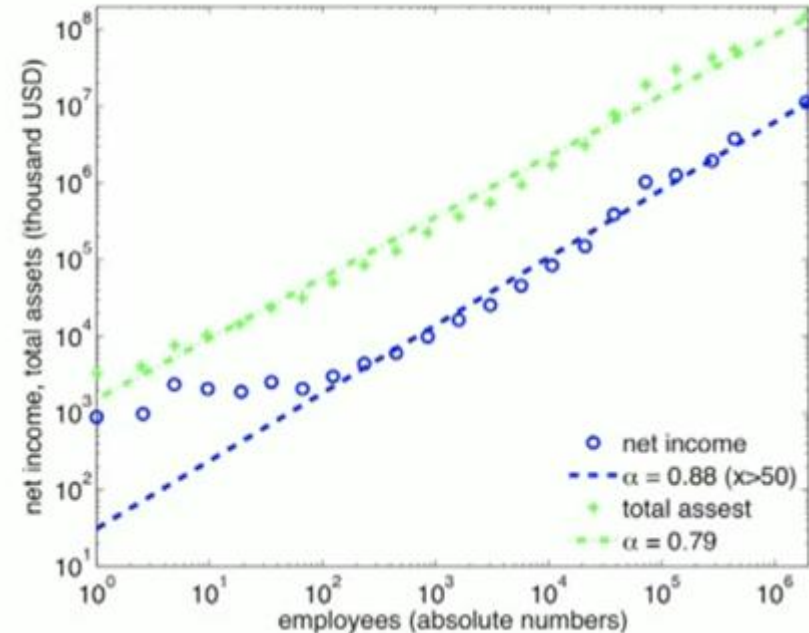


Looking at Walmart and Kleibert, it is clear that scalability or economies of scale and **isometric scaling** are crucial.

As in biology the scaling factor or slope of a companies growth are essential to sustainable growth. If the scale factor is > 1 , economies of scale do not exist and survival not possible.

Isometric scaling shows us that the companies initial conditions are vital. The same beneficial as well as onerous relationships tend to remain as growth continues.

Growth in and of itself is a very potent recipe for disaster. Successful and Sustainable Growth as with Walmart here requires careful attention to the fundamentals that allow for scalability.



Start as you need to finish, scale needs attention from the start

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We see this relationship repeated, everywhere, but sometimes inversely.

The benefits of growth and scale in urbanization are clear

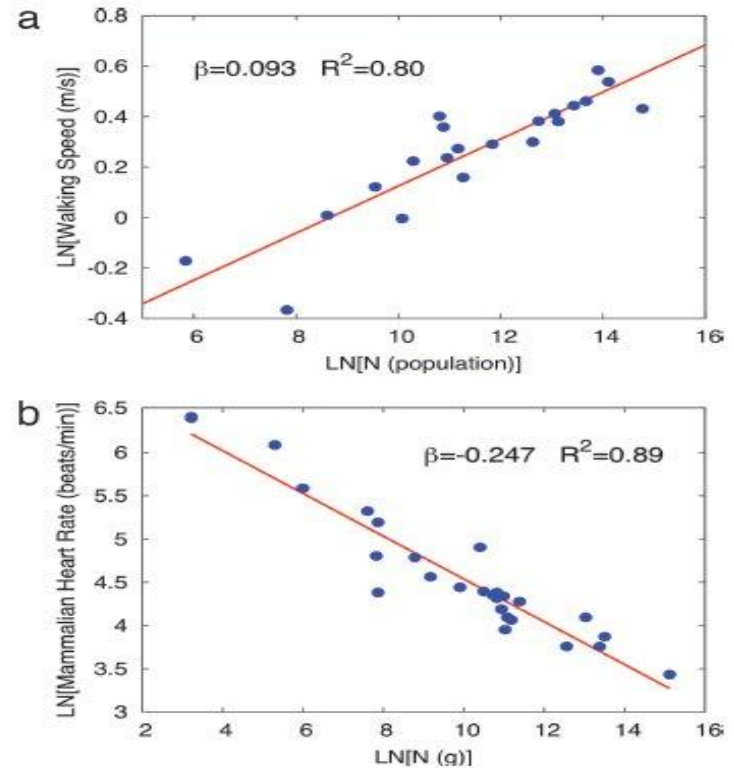
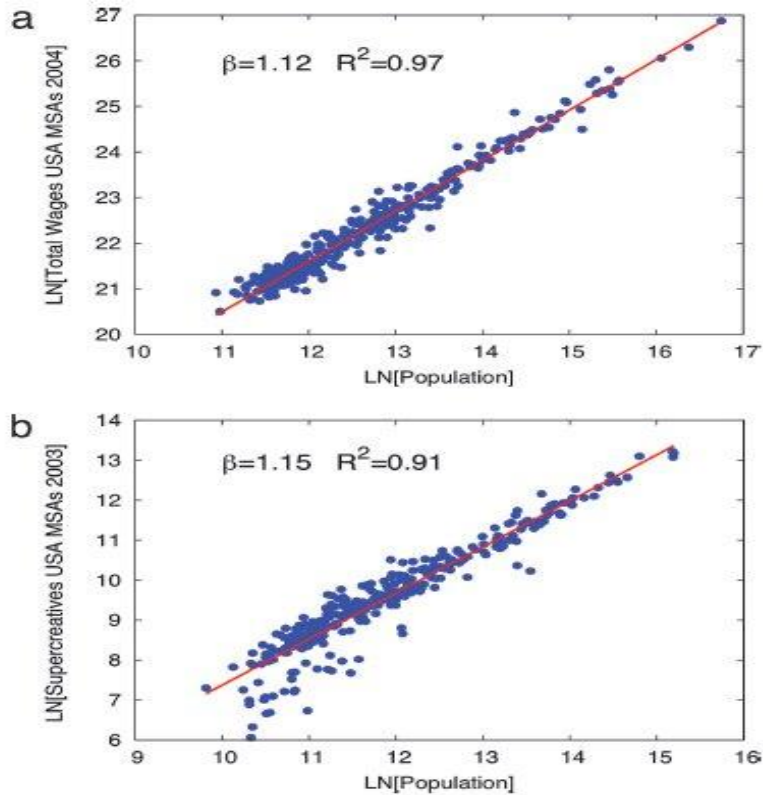


Fig. 2. The pace of urban life increases with city size in contrast to the pace of biological life, which decreases with organism size. (a) Scaling of walking speed vs. population for cities around the world. (b) Heart rate vs. the size (mass) of organisms.

It is not unusual for companies to focus on benefits

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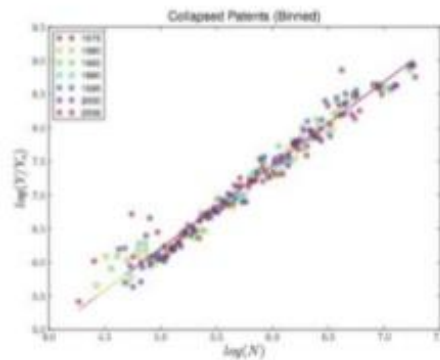


and yet each benefit has some associate consequences sometimes unintended and far from obvious.

Cities & Scalability

All the socio economic quantities

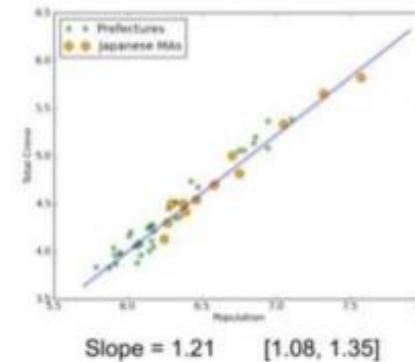
Innovation measured by Patents



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Source - West Geoffrey, *Growth, innovation, scaling, and the pace of life in cities*, PNAS, (2007)

TOTAL CRIME (JAPAN)



Super-linear

Bigger is not always better, go for a jog in Shanghai or Sao Paulo! Not quite the same as Hyde Park or Central Park.

Have you an understanding of the consequences of growth in your business?

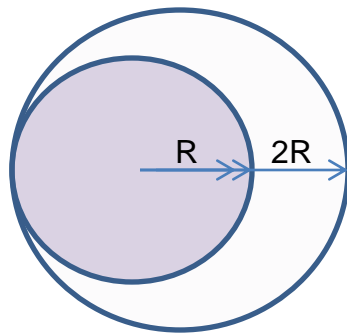
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Isometric Scaling requires us to make decisions about Trade-offs within the business. Careful thought is needed.

Isometric scaling occurs when proportional relationships are preserved as size changes during growth or over time. In so doing, a linear relationship is maintained. A sub-linear relationship, as seen with Body-Mass vs. Metabolism exhibits this scaling,

Isometric scaling is governed by the square/cube law. A doubling in length results in the surface area available to it increased by fourfold, while its volume and mass will increase by a factor of eight. With growth should come the benefit of absorbing shocks, but the degradation of communication and response times. Understand how growth impacts IT, Compliance, Risk, Product Dev, Customer Satisfaction? Be brilliant at what your growth and size allows. You already know this, watching the nippy scrum-half run circles around the lock with no hope of competing in a loose maul!



Increasing R to 2R

Increases Surface Area from πR^2 to $\pi(2R)^2 = 2^2 =$ fourfold!

And Increases Volume from $\frac{4}{3}R^3$ to $\frac{4}{3}(2R)^3 = 2^3 =$ eightfold!

When it works for you, it's fantastic, against you....dire! Ask Lehmann

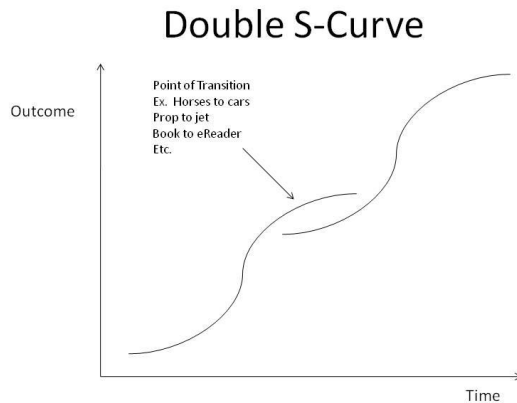
Small Firms MUST do(supremely well!!) the things that large firms cannot do.

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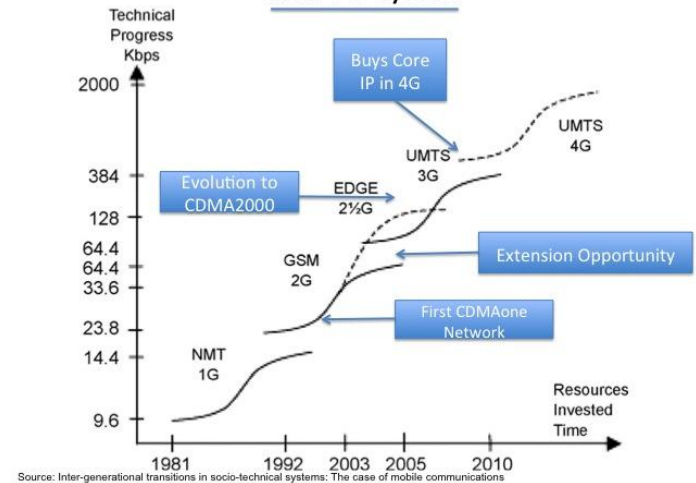


What is the harsh reality?

The reality is quite stark. If you are not moving along the curve or redefining the curve upon which you are measured, then you cease to remain relevant in your niche. For those considering growth, if the initial conditions at which you embark on your journey along the curve do not reflect scalability, then you will perish from the inefficiencies. In some instances serendipity may allow “leap-frogging”, such as in the introduction of motor cars (transitioning from horses) or wireless networks (transitioning from fixed lines). But these instances are the exception and only really obvious in hind-sight.



At the forefront of innovation through 2G, 3G and 4G cycles



Source: Inter-generational transitions in socio-technical systems: The case of mobile communications

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Life is dominated by sub-linear power scaling.

Which enables economies of scale.

Growth is Sigmoidal reaching stability at maturity and subsequent decline.

Isometric scaling infers benefits come at some cost and trade-offs must always be made.

It also infers that initial conditions prior to growth are essential for sustainability.

Businesses and even cities are governed by these “laws of nature”

Now we have these insights, we must use them to our advantage!

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Of course there is further relevance for our S-Curve. It helps us to appreciate how businesses change through their life cycle

Not only does the S-curve call for attention to detail but it helps us understand the changing character, make-up & strengths over time.

	Experiment	Scale	Mature	Decline
Objective	• Validate opportunity	• Scale business model	• Produce cash	• Release cash from unprofitable operations
What motivates managers?	• Passion for idea • Fun and excitement • Recognition	• Share of upside • Satisfaction of building something	• Security of working in established business • Autonomy • Power	• Pay and bonuses for making tough decisions
Who are the best managers?	• Scientists and inventors • Opportunists	• Experienced builders with clarity of focus and drive to execute	• Active stewards who are adept at spotting and neutralizing threats to core	• Turnaround artists who are relentless in instilling financial discipline
Which metrics measure progress?	• Milestones marking specific achievements (often measuring customer adoption)	• Focus on growth and time to profitability	• Numerous metrics, typically refined and financial, often extrapolated from the past	• Measures of cash released from terminating money-losing activities
How to secure or release resources?	• Spread passion for opportunity • Bootstrap • Limit resources required	• Build enthusiasm with exciting growth story • Generate fast profits to protect business from skeptics	• Generate cash to fund growth elsewhere • Protect the core business from any threats	• Prune resources from declining businesses to fund growth elsewhere
Predictability (1 low to 10 high)	1 to 3	4 to 6	6 to 8	8 to 9
Financial institutions that specialize	• Angel funding • Incubators • Early-stage venture capital	• Venture capital	• Banks • Public equity markets	• Leveraged buyout firms

Be prepared for the make-up and character of your business to change, and the roles of the leadership team to change with it.

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A poor macro-economic environment is no excuse to avoid growth strategies.

Too often, the poor state of the economy and exogenous variables are used as an excuse not to strive for growth. This is an understandable but mistaken attitude.

Certainly, revenues experience pressure, and costs increase disproportionately, leaving less cash to re-invest in growth (growth consumes cash!!) But the time-horizon over which the current curve needs traversing, is independent of these economic cycles, because:

- a) Intellectual Property continues to lose protection as patents expire.
- b) Technologies continue to evolve, sometimes faster in a downturn.
- c) Competitors continue to emerge and gain strength.
- d) Clients needs and consumer tastes are always evolving.
- e) Foolishly, businesses retrench and this is your period of prime access to Top Talent, upon which growth relies.
- f) Lastly, excessive growth demands cash and unplanned external funding. Constraint on growth is not necessarily bad.

Often, in avoiding Risk, perversely, Risk increases and forsakes opportunities that arise.

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The roadmap of successful growth need not be over-complicated, but conversely its many pitfalls need to be appreciated. Those that are intimidated by the risk, and who see the macro economy as a hindrance, ironically expose themselves to greater chance of failure in their attempt to avoid risk.

Growth requires a scalable business model, which in turn requires disciplined decision making based on sound strategies, with the careful management of cash and productivity, these in turn require data and some standardization of key business processes, which in turn now demands the activities of the successful startup entrepreneur shift to leading the business and creating the right structures, etc (the reasoning cascades through out the business)

This need not be a daunting, lonely journey but one in which coaching enables key mistakes to be avoided and new business tools adopted at very little cost, but to great effect.

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