

The 'multiplication effect' in human accomplishment:

A thought paper

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A. Introduction and background

Accomplishment has been identified as one of the core and essential elements of human well-being by the scholars from field of Positive Psychology. (From the 'PERMA' model proposed by Dr. Martin Seligman) Understanding processes and factors that contribute to superior human accomplishment is a subject of universal significance. It is of relevance to us as we think about ways in which we can enhance our own accomplishments and also to help improve accomplishments of our children, our students and our colleagues at work. Different streams of work from fields such as psychology, sports, philosophy, management and leadership development attempt to throw light on this subject. Let's look at three examples to get a flavour of the variety of answers that are provided by different scholars: (The examples have been consciously selected from three different kind of sources: academic scholarship, popular science and consulting)

- A cross section of papers from top journals in psychology conclude that 'general intelligence' ('g') and the personality factor called 'conscientiousness' (from the 'big five factor' model of personality) are the two best predictors of performance in a wide variety of job settings.
- Malcolm Gladwell argues in his book 'Outliers' that many factors external to the individual contribute to significant achievements and it's a mistake to focus all our attention on the individual. (To quote Gladwell : *" What I came to realize in writing Outliers, though, is that we've been far too focused on the individual—on describing the characteristics and habits and personality traits of those who get furthest ahead in the world. And that's the problem, because in order to understand the outlier I think you have to look around them—at their culture and community and family and generation. We've been looking at tall trees, and I think we should have been looking at the forest."*)
- ' Now Discover Your strengths' , the bestselling book written by scholars from The Gallup Organization argued that leveraging our 'talent' , i.e. a naturally occurring pattern of thought , action or behaviour that can be productively applied' , is the best strategy to deliver exceptional performance.

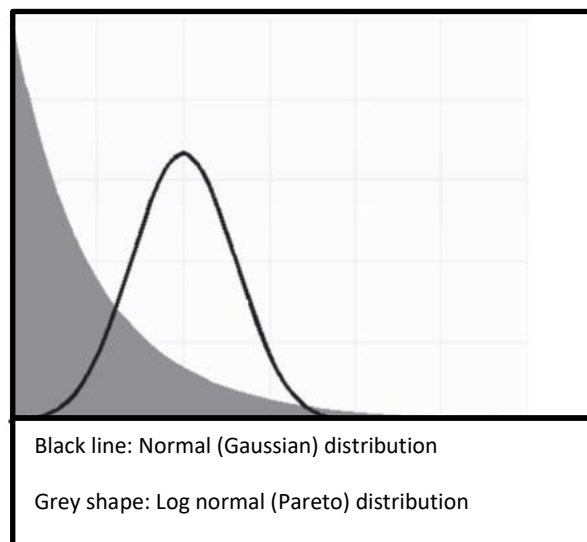
I am sure we can think of many more examples of such factors propounded by different scholars and institutions. As we can see, these different models often contradict each other and lack any coherent interconnections – giving rise to two significant challenges:

- Each of these models does a good job of explaining the specific set of examples used by the proponent but fail to explain a wider variety of real life phenomena.
- Such wide range of models, which are often disconnected, are not very helpful in guiding our efforts on accomplishments.

This highlights the need for a universal and comprehensive model for human accomplishment.

Human accomplishments: Not a ‘normal’ but ‘log-normal’ distribution

While studying various models related to human accomplishments, I came across two pieces of work that make the argument **that in statistical terms, the human performance / accomplishment in a given field is represented by a ‘log-normal’ (Pareto) distribution and NOT by ‘normal distribution’, (Gaussian) as it is conventionally believed.** *(Incidentally these two studies reach the same conclusion using data drawn from totally different contexts).*



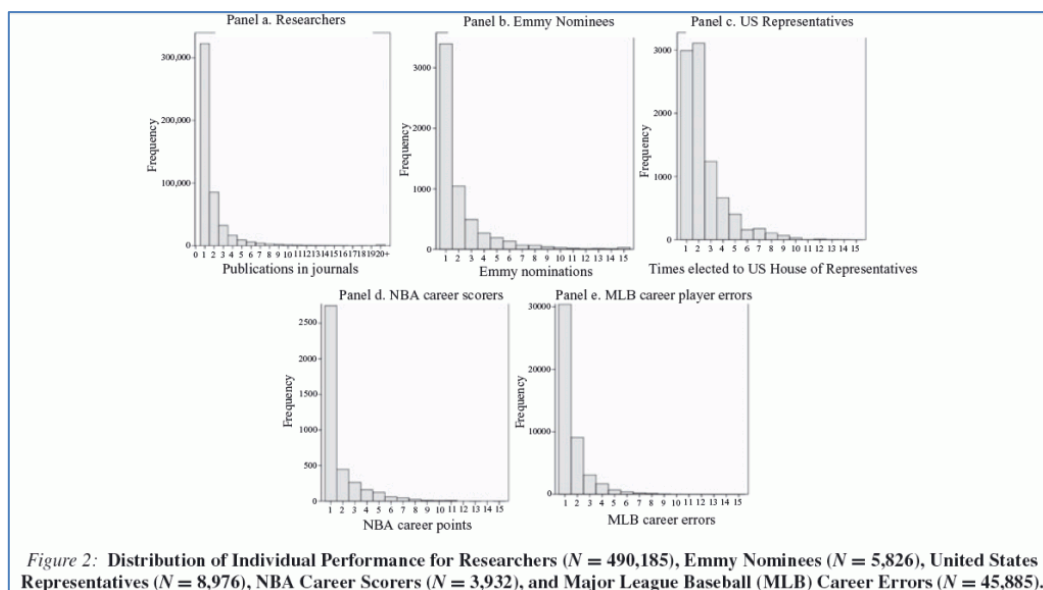
The first piece of work is a research paper published by **Ernest O’Boyle Jr. and Herman Aguinis in 2012, titled ‘The best and the rest: Revisiting the norm of normality of individual performance’ published in one of the best Industrial Psychology journals in the world, ‘Personnel Psychology’.**

The difference between these two distributions can be understood using one of the data sets used in this paper –that of researchers, which uses ‘number of publications’ as a measure of performance.

While the 'normal distribution' will predict that majority of researchers will have published an average number of publications, the Pareto distribution will predict that a large number of researchers will have published minimum – say 1 or 2 papers and the majority of researchers will have published less than the average number of papers. The most important prediction that the Pareto distribution makes is that there will be a very select number (1 or 2) of researchers who would have published a significantly high number of publications and their output will represent a disproportionately large percentage of the total combined output in the field. **In other words, it can be said that the best performers form a field produce results that are better than the average performer not just by a few percentage points but by few multiples.** (This is the classic 80/20 principle and the principle of 'long tail'). As we can intuitively guess, the actual data fits the Pareto distribution far better as compared to the normal distribution. For this paper, the research team looked at five different areas of work: (the performance measure used in each area is indicated in brackets)

1. Research (*number of publications*)
2. Music (*number of Emmy Award nominations*)
3. Politics (*number of times elected to US House of Representatives*)
4. Basketball (*number of career points*)
5. Baseball (*number of career errors*)

In each of these data sets, the pattern was distinctly 'Pareto' – a very small number of individuals producing a significantly large proportion of performance. (Graphs from the original paper included below)



(Incidentally another study related to research publications, done by Podsakoff and others in 2008 showed a very similar pattern – there are many researchers who have very few top publications, but a very small number of elite researchers have a large number of top publications: **Top 25% of management authors account for 55% of publications and 86% of citations. 5% of the universities account for more than 60 % of publications**)

The second piece of work is a book called ‘**Human Accomplishment**’ written by American scholar **Charles Murray**. He has systematically studied the time span of around 2750 years – starting from 800 BC to 1950 – and looked at twenty one intellectual fields – including various streams of science (astronomy, biology, physics and others) literature, philosophy, painting and music. Across such a wide spectrum of fields spread over such a great period of time, again the Pareto pattern is distinctly visible – each field has one of two giants who have momentous impact on the field (for example - Shakespeare in field of literature or Edison in field of science and technology) followed by a handful of very important contributors and a large majority of individuals with very small impact.

Reflecting about these two pieces of work triggered the following thoughts:

- a) *The point that the best performers outperform the average performers by a few multiples is not something that we don’t know. In fact it is something that we know, but for some strange reason we don’t draw many learnings form it. It is also something that we don’t factor into our general ways of working (e.g. we continue with the assumption of normal distribution when it comes to performance management process)*

- b) *It will be great to know what factors allow these best performers to reach such great heights of accomplishment. What can we learn from them?*
- c) *Is it the case that these 'giants and geniuses' are unique and exceptional in some special ways and common people will never be able to match their achievements?*
- d) *What implications does this have for our work related to human processes – whether in educational or organizational settings (say selection, performance management, development and other processes)*

Martin Seligman's description of the log-normal distribution of human accomplishment (in his significant book 'Flourish') made me dig deeper into this subject. Seligman and his colleague Angela Lee Duckworth at the Positive Psychology Centre at University of Pennsylvania have been studying a construct called '**grit**' and its contribution to superior human performance. **They define grit as 'perseverance and passion for long term goals' and argue that it is one of the best predictors of exceptional performance.** Essential ingredients of grit, as per their definition are:

- *strong and sustained (over prolonged periods of time – spanning over say a few years) interest in a particular field, accompanied by*
- *significant efforts in building as well as applying the capabilities*
- *without getting stalled or slowed down by the setbacks and problems faced in this process.*

Their research has shown grit to be a great predictor of performance in a variety of domains such as college education, spelling bee competition, military training academy and teaching (Teach for America program). They capture the essence of this principle with following formula

Achievement = Skill (we can also call it talent / innate ability) * **Effort** (i.e. Grit and self-discipline)

In fact their research has shown that often the best achievers are not necessarily the most talented individuals but are the most gritty individuals. *(Duckworth has emphasized again and again that this theory should not be taken to mean that talent has no role to play in superior achievement – but should be used to understand that talent is no guarantee for high achievement and that often individuals who lack a bit in talent can more than make up for it, through grit)*. One of the most significant features of grit is that it is a non-cognitive (not pertaining to innate mental faculties such as memory and problem solving) factor to a great extent and hence an individual can potentially take conscious efforts to enhance it.

Review of this work convinces us that grit is a very significant and meaningful construct and it will certainly improve our understanding about ingredients of high performance.

Seligman argues that one of the key reasons why grit enables individuals to more than compensate for some shortfall in talent is the 'multiplication effect' in the above equation (Achievement = Skill * Effort) – due to which even a marginal difference in grit can have an amplifying effect on overall achievement.

As someone who is deeply interested in studying process of human achievement I am always looking for the ultimate root factors – that have the power to explain a large number of phenomena that we observe. Was grit looking like one of the ultimate 'root factors/ causes'? – I definitely thought it was. But at the same time I also felt that something was still missing and this was not the complete answer. A few questions were still troubling me -

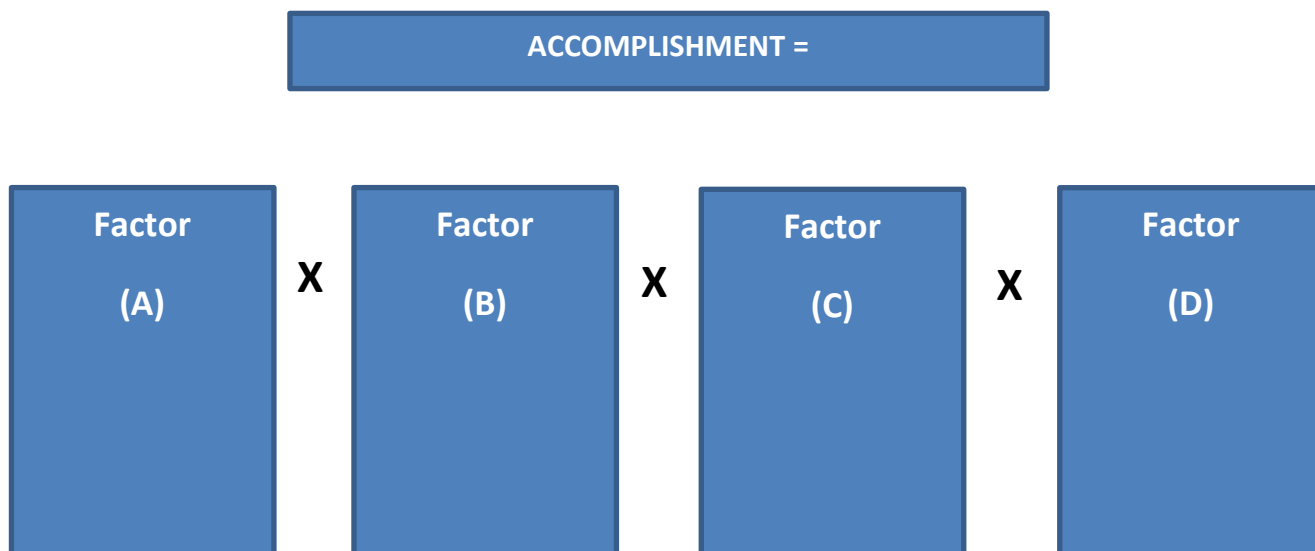
- Do grit and skill completely explain the whole spectrum of human achievements? Or some more significant factors are missing from the equation?
- What enables an individual to be on the whole grittier than other individuals?
- What enables the an individual to be grittier in certain domains of his or her life than other domains?

This made me pose a challenge to myself – will it be possible to integrate these insights and all that I know about human accomplishments as of now, to create a comprehensive 'model of human accomplishment' , that can meaningfully guide our thinking ?

What follows is the 'Version 1.0' of my attempt to respond to this challenge.

B. The 'multiplication effect' model for human accomplishments

I would like to propose that an individual's total accomplishment is a result of multiplication between a key set of factors.



Significance of multiplication effect: Before we start the discussion about the actual proposed factors, let's spend some time to understand the significance of multiplication effect. We will use a very simplistic mathematical example here:

Name	A	B	C	D	(A*B*C*D)
Joe	1.0	1.0	1.0	1.0	1.00
Champ	1.3	0.9	1.8	2.6	5.48

Percentage Difference	447.6%
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Let's assume that the average strength of each of these four factors in the general population is 1. This means that as per formula above the level of average achievement will be equal to $1*1*1*1 = 1$. It is not uncommon that a few people in the population have exceptionally high strength on some of the factors (say 'Champ' above has a strength of 2.6 on Factor D) as the table above shows , such differences get significantly amplified due to multiplication effect and result in large differences in the end results (achievements) – 447% in the above example.

Pattern with exceptional super achievers: When we study the ‘giants’ from any field , most often we can identify the following common themes – early start, laser sharp focus, awareness and honing of own talents, prolonged immersion, continuous experimentation and deliberate practice, efforts to obtain external enablers – such as teachers, experiences, almost religious and mystical devotion to one’s own craft. What this means is that these giants end up having exceptionally high strength on each of the factors and hence as a result produce results that are in a totally different league compared to the average population (classic Pareto pattern) , as the table below illustrates.

Name	A	B	C	D	(A*B*C*D)
Joe	1.0	1.0	1.0	1.0	1.00
Giant	4.0	3.8	5.2	4.9	387.30

Percentage Difference	38629.6%
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Proposed factors

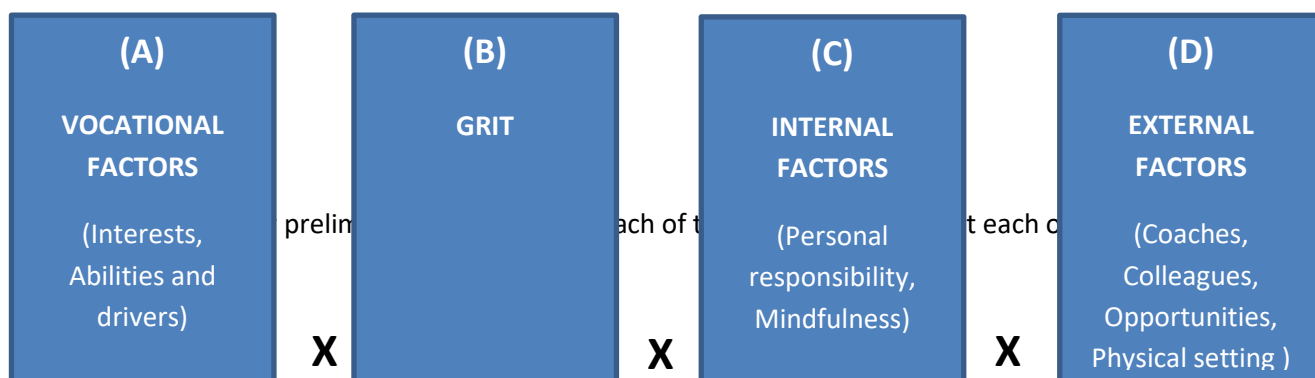
In this first version of the model, I propose that the following four factors play a significant role in human accomplishment

- A) Vocational factors (Interests , abilities and drivers)
- B) Grit
- C) Internal factors
- D) External factors

As I will describe further in the model, most of these factors have an ability to influence the other factors and hence creating one more level of multiplication effect. It is my submission, for example, that an individual will find it easier to be ‘gritty’ in a particular activity if that activity is better matched with his ‘vocational factors’.

This double multiplication effect explains the exponentially high output produced by the giants of any field – all the factors come together to create a life that is an integral whole.

ACHIEVEMENT =



factors and their possible interrelationships deserve a much deeper study, elaboration and analysis.

A) Vocational factors: Interests, abilities and drivers.

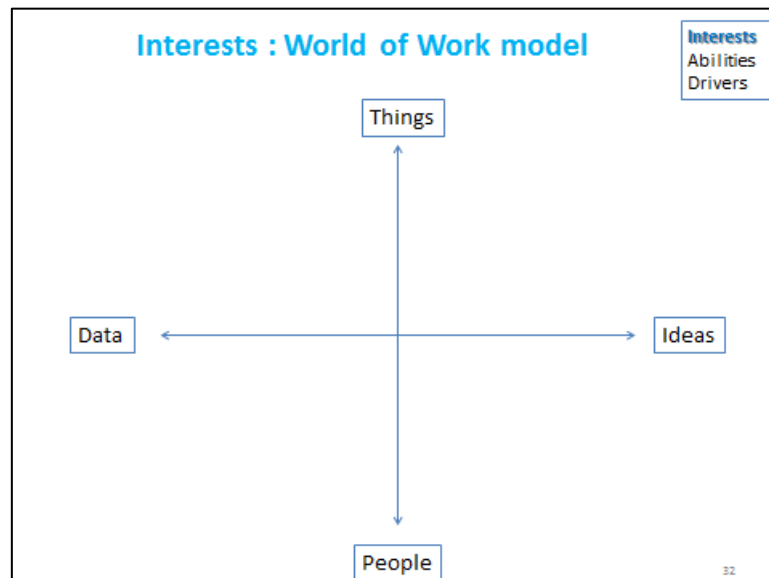
I have often felt that the advice provided by the field of vocational psychology (in the rare instance that it is sought , in the first place – especially in India) is either too complicated (a long list of psychometric tests with lengthy reports that the individual finds very difficult to understand and integrate) or too narrow (for example , providing career advice on basis of only one factor – say ‘Abilities’) or too vague (for example – advice such as ‘you are most suited for a government job’)

It is my submission that ‘interests, abilities and drivers’ represent three core elements of vocational orientation of an individual, that when considered together provide a very meaningful direction.

Failing to factor in even one of these elements results in exclusion of a few core dimensions and significantly distorts and limits the quality of vocational or developmental advice.

Interests: This simply represents the domain / field of work that an individual aspires to contribute to. The four quadrants of ‘World of Work’ map designed by ACT (www.act.org , a private, not for

profit American consulting firm in the field of occupational psychology.) can be a good starting point to think about this element.



Abilities: These are cognitive / interpersonal / artistic or kinaesthetic capabilities that enable us to do certain things well. They usually have certain roots in our personality and usually show wide variation across different individuals. (The definition of ‘talent’ provided by Gallup organization describes this element in a very good way – ‘naturally occurring patterns of thoughts, actions or behaviours that can be productively applied’)

Drivers: These represent our preferences about work configuration and the kind of rewards (monetary and non-monetary) that we seek from our work. Very often, the career counselling process completely misses out on this element and gives rise to serious distortions. To give a very simplistic example – consider an individual who has ‘Interest’ in the field of money and economics and has strengths in ‘Abilities’ pertaining to quantitative and analytical areas. If her ‘Drivers’ are linked to intellectual challenge and expertise – she will be more suited to follow a career in the field of research. But on the other hand, if her Drivers are about acquiring wealth and managerial authority, she may be more suited to follow a professional career in field of finance.

Among all the four factors, this set of factors (Vocational) is likely to have the most significant genetic/personality linked component.

As it can be observed, the three elements described above are not completely exclusive, but interconnected. For example a person who has ‘Abilities’ in quantitative domain is likely to be ‘interested’ in areas of work that deal with data.

It must also be noted that the process of figuring out a career direction on basis of Interests, Abilities and Drivers is not linear and algorithmic – but must include a significant component of

B. Factor of 'grit': As described earlier, this has been defined as 'perseverance and passion for long term goals'. The other facets of grit such as significant efforts in developing and applying capabilities and ability to continue the efforts without getting affected by setbacks have been captured earlier. It must be noted here that 'deliberate practice' (*defined as a capability building process, that consists of focused, repetitive practice in which the subject continuously monitors his or her performance, and subsequently corrects, experiments, and reacts to immediate and constant feedback, with the aim of steady and consistent improvement*) is often an important component of gritty effort.

C. Internal factors: These are a set of factors that determine the extent to which the individual is able to work towards realizing his or her full potential. I think the following interconnected elements are of relevance here:

i) Personal responsibility – The sense of 'agency' and ownership shown by the individual. The extent to which the individual believes that he or she can influence things.

ii) Mindfulness - Jon Kabat-Zinn (a scholar at University of Massachusetts) defines mindfulness as '*paying attention in a particular way - on purpose, in the present moment, and nonjudgmentally*'. There is increasing body of evidence that is showing that enhancing our mindfulness has all round positive impact – on our performance, our relationships and our mental and physical health.

iii) Self-awareness – How well does the individual understand own personality , motivators and other factors and how well does the individual use this knowledge in crafting and executing a most appropriate life strategy

iv) Human energy – How well does the individual manage and leverage all components of human energy (one of the most intuitive frameworks on this subject is provided by Tony Schwartz which says that the four components of human energy are: Physical, Mental, Emotional and Spiritual)

D. External factors: The exact set of external factors that will influence an individual's achievement will obviously vary from one individual to another and also across various situations. Hence an exhaustive listing of all external factors that matter in all conditions will not be possible. But at the same time, we can think of a small set of external factors that probably have a bearing on most of us

i) Social influencers: An individual's important social connections are likely to significantly affect his or her accomplishment – life partner, close friends and family, presence or absence of good teachers and mentors can make a big difference to the person's accomplishments.

ii) Resources: The quantum and quality of resources available to an individual can have a significant bearing on the individual's accomplishment. How the individual uses the available resources also has a large impact (e.g. a resource such as internet can be used either in a very productive way or can be used to waste a lot of time and energy)

The list of external factors can also include aspects such as 'timing' (being at the right place at right time – as described by Gladwell in his book Blink), physical setting and presence or absence of an ecosystem.

It is no surprise that all progressive human societies strive to create equality of opportunity to ensure that at the basic level, the key external factors are made available to all.

(Any discussion about external factors cannot be complete without the caution that most often people use lack of external resources as an excuse for non-performance. This is hardly justifiable because in all domains of work we know many individuals who have overcome lack of critical resources using the strength of their willpower and resourcefulness. The typical achievers don't act as passive recipients of 'External Factors' but take personal responsibility to make them happen.

The factor is being described here simply to capture the fact that it has the power to influence an individual's accomplishment. Better understanding of this factor can help an individual to think strategically about external resources and work on acquiring them to enable the accomplishment)

C. KEY INSIGHTS THAT CAN BE DRAWN FROM THIS MODEL

1. Critical importance of alignment of factors

The multiplication effect makes it critical that all factors are aligned to ensure the best possible performance. For example:

Name		Vocational	Grit	Internal	External	Multiplication
Joe						
	Generalist	1.0	0.9	1.0	1.0	0.90
	Specialist	3.0	2.0	1.0	1.0	6.00

Percentage Difference	566.7%
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In this simplistic and hypothetical example it is shown that Joe has a vocational strength as a 'Specialist' (and for the purpose of example it is assumed that 'Generalist' and 'Specialist' are opposite ends of the scale) – which means that the strength of his Vocational Factor will be significantly diminished in a the Generalist role and it may even negatively affect his Grit Factor (since his Vocational Factors are misaligned to the job, he may find it difficult to put sustained efforts) resulting in a below average total performance (score of 0.9)On the other hand, once he moves to a specialist role, where his Vocational Factor is better aligned, his Grit Factor may also go up and hence showing a significant increase (566%) in overall performance to a score of 6.

(We can illustrate this with a simplified example – for a moment if we say that Joe has Abilities and Drivers that create in him a natural tendency and flair to think deeply about work and do a great deal of detailing and background study of any task at hand – this will probably slow down pace of his work and make it difficult for him to handle a wide range of activities at speed. This configuration of Vocational Factors will become an asset in a 'Specialist' role, but a serious liability in a 'Generalist' role)

The most important insight here is that effective strength of your 'Vocational factor' depends on how well aligned it is to the actual task/role at hand. **Hence we should always be on the lookout for situations, projects, roles and careers that help us align all our factors to ensure best performance.**

In fact situations where we feel that a person is not delivering in line with her potential (and often these are few of the most talented people we know) are almost always caused by the lack of alignment of these factors and the role.

2. Significant power of the negative ‘multiplication effect’

The multiplication effect also implies that the moment any one or more factors for an individual go below average levels (below 1, in our example) it will bring down the overall performance even when the individual has significantly positive score on other factors.

Name	Vocational	Grit	Internal	External	Multiplication
Joe	2.0	0.5	2.0	2.0	4.00
Champ	1.8	2.0	2.0	2.0	14.40

Percentage Difference	260.0%
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In the example above, the more ‘talented’ Joe takes it easy (and hence his Grit Factor score is 0.5) but the less talented Champ more than makes up for the shortfall in talent by overinvesting in Grit factor and hence producing significantly better overall performance than Joe.

3. Infinitely complex nature of human accomplishment

While these four factors certainly can guide our thinking, we can easily think of factors outside these four which an individual can bring in to create a unique kind of performance. One of the patterns that is often seen with the ‘giants’ from any field is that they push the boundaries and redefine forms – effectively adding a new, unique ‘X factor’ to the equation.

(In fact each one of us can also potentially bring in our own ‘magic sauce’ to work to create such X factors. This reminds me of a cartoon by my favourite artist Hugh MacLeod, which says ‘Don’t be the best in the world at what you do, be the only one in the world who does what you do’. It also makes us realize the inherent limitations involved in exercise of comparing two individuals.)

Name	X Factor	Vocational	Grit	Internal	External	Multiplication
Monk		1.0	2.0	4.0	3.0	24.00
Giant	4	3.0	4.0	2.0	1.0	96.00

Percentage Difference	300.0%
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4. Accomplishment has unique and individual pattern

Since the weights for individual factors are assumed to be similar (or there are such a large number of factors with indeterminate weights) , there is no one factor that guarantees success – each individual can have his or her unique pattern and still deliver great results. (I am sure we can think of many examples form field of sports where one player delivers supreme performance on basis of natural talent and the other on basis of sheer hard work and practice – Say Sachin Tendulkar and Rahul Dravid from the world of Indian cricket)

Name		Vocational	Grit	Internal	External	Multiplication
Monk		1.0	2.0	4.0	3.0	24.00
Champ		3.0	4.0	2.0	1.0	24.00

Percentage Difference	0.0%
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This is a very liberating and empowering thought – which makes us realize that on factors such as Grit, Internal and External we potentially have a great degree of control and with conscious efforts we can increase their strength and significantly enhance our overall performance.

It is my submission that the Vocational factors are less amenable to change – and here our strategy needs to be focused on developing a deeper understanding of our personality and using it in the best possible way to accomplish great results. This is the **'Choose easy'** part of the equation described by the psychologist Angela Lee Duckworth. (The second part of that equation is **'work hard'** and it is about improving grit and other factors)

D. CONCLUSION

The most important insight that can be drawn from this model is that ultimately each individual's journey of growth and accomplishment is unique and the real competition and comparison needs

to be only with one's own self. This journey is all about developing a deeper self-awareness and creating better alignment between all facets of one's life.

It also means that each one of us has potential for great accomplishment- because by best leveraging the unique combination of our ' factors' we can achieve things that no one else can - we just need to figure out the exact game that we should be playing.

I sincerely believe that the world will be a far better place, if each person found his or her 'best alignment' and the route to meaningful accomplishment.

Buddha had given this message many centuries ago:

'The work of your life is to find your life's work, and then with all your heart give yourself to it'

It is up to us now to understand its true meaning and 'live it'.

Acknowledgement: *I first read Martin Seligman's book 'Authentic Happiness' in 2004 and things have never been the same again. That book opened the world of Positive Psychology for me and since then, I have gained enormously from the insights from the field in my professional as well as personal life. I will be forever grateful to Dr. Seligman and all the scholars and philosophers from the field of Positive Psychology who continue to help us find and understand what it truly means to live a great human life.*

Author's note: *This 'thought paper' is based on my current understanding of various streams of psychology and behavioural science. Since I have not done a systematic academic review of literature, it is very much possible that there are gaps in my understanding or some important references have been omitted. I wrote this 'Version 1.0' to start a conversation – so please do share with me your feedback and critique – it will help me refine this work. You can reach me at shaileshdesh@gmail.com*