

## Chapter 1 : Knowing Your Operational Capacity | Your Small Business Growth

*Knowing Your Operational Capacity Avoid Blowing Your Revenue Engine - Visiting Your Operational Capacity. Many small to medium sized businesses struggle increasing sales because they don't know their operational capacity.*

It is essentially a number that describes the rate at which an investment would have grown if it had grown the same rate every year and the profits were reinvested at the end of each year. In reality, this sort of performance is unlikely. However, CAGR can be used to smooth returns so that they may be more easily understood when compared to alternative investments. The average arithmetic mean annual return for that period was The CAGR over that period was The CAGR for this period can be calculated as follows: A compound annual growth rate over a three-year investment equal to For example, imagine an investor is comparing the performance of two investments that are uncorrelated. In any given year during the period, one investment may be rising while the other falls. This could be the case when comparing high-yield bonds to stocks, or a real estate investment to emerging markets. Using CAGR would smooth the annual return over the period so the two alternatives would be easier to compare. Due to market volatility , the year-to-year growth of an investment will likely appear erratic and uneven. CAGR helps smooth returns when growth rates are expected to be volatile and inconsistent. CAGR can be used to compare investments of different types with one another. The rate of return in the stock fund will be uneven over the next few years so a comparison between the two investments would be difficult. Using CAGR to compare the two investments can help an investor understand the difference in returns. On the surface, the stock fund may look like a better investment with nearly nine times the return of the savings account. However, by smoothing the returns, CAGR cannot tell an investor how volatile or risky the stock fund was. CAGR can also be used to track the performance of various business measures of one or multiple companies alongside one another. In this way, comparing the CAGRs of measures within a company reveals strengths and weaknesses. Comparing CAGRs of business activities across similar companies will help evaluate competitive weaknesses and strengths. Before the CAGR calculation can be performed, the investor will need to know the fractional remainder of the holding period. They held the position for days in , a full year in , , , and , and days in This investment was held for 5. Limitations of Compound Annual Growth Rate - CAGR The most important limitation of CAGR is that because it calculates a smoothed rate of growth over a period, it ignores volatility and implies that the growth during that time was steady. Returns on investments are uneven over time, except bonds that are held to maturity, deposits, and similar investments. Another limitation of using CAGR in assessing investments is that, no matter how steady the growth of a company or investment has been in the past, investors cannot assume the rate will remain the same in the future. The shorter the time frame used in the analysis, the less likely it will be for realized CAGR to meet expected CAGR when relying on historical results. A third limitation of CAGR is a limitation of representation. If the fund managers represented in that their CAGR was a whopping The formula can be manipulated algebraically into a formula to find the present value or future value of money, or to calculate a hurdle rate of return. How much does the average rate of return need to be in order to reach that objective? The CAGR calculation can be used to find the answer to this question as follows: This version of the CAGR formula is just a rearranged present value and future value equation. It can also be used to compare investments or other growth rates. Compound Annual Growth Rate: What You Should Know.

### Chapter 2 : How to Calculate Growth Rate (with Calculator) - wikiHow

*To many readers, "Calculating a growth rate" may sound like an intimidating mathematical process. In actuality, growth rate calculation can be remarkably simple. Basic growth rates are simply expressed as the difference between two values in time in terms of a percentage of the first value.*

This answer throws up a red flag for how well the rest of their business is running. You need to make sure you understand your operational metrics not just your financial ones. Not knowing how much more business you can handle can be the kiss of death for your company. Not being able to deliver on your orders will put you out of business faster than having too few sales. Do you know exactly how much money your business operation can produce? Can you see the problem here? First, determine how long it takes someone working around the clock to complete one unit of your service or product. This is referred to as your cycle time. Next, take the total number of available work hours and multiply this by the number of employees that complete work. Then divide this number by your cycle time. The result is the maximum number of units your business could produce – your maximum capacity. To determine the maximum revenue just multiply the maximum capacity by the average price per unit. Can they get there from here? Next, it takes a technician, of which they have 20, about 3 hours to provide their service to a customer for a single job. So, in a typical day a technician can make 2 service calls or about 6 hours of billable time. If you multiply this time 20 days in an average month there are billable hours per month. Here is their maximum calculation: That means a they need a capital investment to get there. So, the owner may need to reassess their revenue goal or start saving for the inevitable hire. Now, you can appropriately set your sales objectives. Calculate Your Operational Capacity! Just click the icon and find out more. Want to calculate your operational capacity for yourself and use this simple yet powerful management model to make more predictive and profitable decisions by joining us at our regular FREE Tuning Your Revenue Engine Masterclass webinars. Just click the button below to pre-register for our next webinar.

**Chapter 3 : How to Calculate Growth Percentage | Pocket Sense**

*One way to develop a model that incorporates a carrying capacity is to make the reproduction be proportional not only to the population size but also to the fraction of unused carrying capacity. The resulting model is the logistic model for population growth.*

If one area cannot accommodate the forecasted population, then other community plans within the same subregion should have sufficient capacity to accommodate the subregional forecasts above. It does not mandate specific levels of growth for any specific area neither minimums nor caps. The population could grow more slowly than currently anticipated as a result of economic trends, or again expand rapidly as a result of changing immigration levels and birth rates. Population loss could also occur. The Framework Element policies will not directly prevent nor cause population growth to occur. Population levels are dependent on a wide variety of factors, many of which are totally unrelated to land use planning. Such variables as birth and death rates, income, migration and immigration levels, Federal immigration policies, natural disaster, economic trends and employment levels, etc. Population levels, while partially related to building permit development activity, are also not directly tied to the number of housing units available. Population increases or decreases can occur during periods of slow or even no growth in the number of available residential units. Similarly it is possible, at least for short periods, to have stable or declining population levels during periods of rapid housing unit construction. Over shorter time periods, construction cycles and populations trends may not be consistent. The Framework Element is designed to accommodate population growth largely within centers, districts, and mixed-use boulevards whenever it eventually occurs. Forecasted population levels may be reached by as forecasted, or within a totally different time horizon for reasons unrelated to the general plan. Information on environmental conditions will also be monitored on a yearly basis to maintain and update an environmental database, which will be used to facilitate but not replace, environmental review for subsequent programs and projects in accordance with CEQA. Infrastructure data will be developed from a cooperative effort among the City departments responsible for infrastructure and public services. Yearly monitoring will help evaluate whether the incentives that are linked to targeted growth areas are working effectively with market forces to attract new development. The information from such a monitoring system will be presented to the City Council in the form of an Annual Report on Growth and Infrastructure, which can be used as the basis for revision of policies as needed to meet the goals of the Framework Element. The status of environmental mitigation requirements can also be determined and policies can be changed if desired results are not being obtained. Information on amounts and location of growth can be provided and policies influencing this growth can be revised if needed. In this fashion, the Framework Element can be continually updated to meet changing conditions, and the implementation mechanisms revised or altered to achieve the desired goals. SCAG will require monitoring in all its subregions in a similar manner. This is based on the assumption that all lands in the City would convert to the maximum density allowed, referred to as the "Theoretical Buildout. Experience indicates that many properties would not be developed to their maximum permitted densities. For example, fewer than five percent of the commercial properties currently allowed to develop at a floor area ratio of 1. At the same time, the impacts of the additional level of growth must be found to be consistent with the findings of the Environmental Impact Report regarding their level of significance. Should additional potential impacts be identified, these would be subject to further environmental review in accordance with the CEQA. This would be facilitated by the implementation of a program to monitor the characteristics and impacts of growth and availability of infrastructure and public services the "Monitoring Program" and annual reporting of this information to the City Council the "Annual Report on Growth and Infrastructure" as a basis for the planning and funding of necessary improvements. Further, the most recently adopted Housing Element has identified the Framework Element as an implementation mechanism for several of the programs that it contains. While the Housing Element and the Framework Element are closely related, there are data references within each that appear to be inconsistent. Most of the apparent inconsistency is created by differing time horizons and methodological requirements within the two documents. Calculation of

the number of housing units that could be developed in the City as determined, separately, by the Housing Element and General Plan Land Use Element community plans seems to create the most confusion. Housing unit calculations from either the community plans or the Framework Element, using general plan designations per CEQA requirements, assume that all residential units are located on properties planned for residential or mixed-use developments that integrate housing with commercial uses and that these properties are built to their maximum capacity. This is a theoretical "capacity" figure which overestimates the realistic number of dwelling units that would likely be constructed. All properties are assumed to be redeveloped to their maximum capacity despite their current use or the economic feasibility of this occurring. As calculated in the Framework Element, this estimate also does not consider limitations imposed by the existing number of parcels and their irregular configurations. Further, it assumes all residential uses on commercially zoned lands are redeveloped to their planned, non-residential use. The Framework Element housing capacity estimate is considered a "worst-case" impact assessment for the purposes of CEQA, which means that it assumes land is completely builtout to the fullest extent allowed by the zoning. Within the Housing Element more precise calculations are required. Residential units currently on land not planned for residential use are not excluded. The Housing Element estimates are produced for a specific purpose with detailed requirements and will not be comparable to Framework housing unit theoretical buildout calculations. However, they are not incompatible with these Framework calculations. Because of the additional restrictions on Housing Element housing capacity data except for residential units on non-residential parcels, the "housing capacity" estimate in the Housing Element is lower than that found in the Framework Element. The housing capacity numbers will change as the Housing Element is updated. The Housing Element distributed the Regional Housing Needs Assessment allocation, produced by SCAG for the City of Los Angeles, into income categories and divided these allocations further by subregions of the City based solely on the relative size of each subregion. The Framework Element produced employment and income forecasts for each community plan area for the year as well as housing unit forecasts by rent and price level, and from this derived housing affordability levels by community plan area. Comparison between market trend data for and Framework Element impacts for were also calculated. Impacts of other policy actions on housing affordability can be examined through varying inputs to the Framework Element economic impact and forecast model. In combination with the policies in the Housing Chapter of the Framework Element, these distributions implement the Fair Share Allocation program documented in the Housing Element.

## Chapter 4 : CAGR - Compounded Annual Growth Rate

*About Percent Growth Rate Calculator. The online Percent Growth Rate Calculator is used to calculate the annual percentage (Straight-Line) growth rate.*

More information about video. Environmental limits decrease growth rate One of the simplest types of discrete dynamical systems describes the exponential growth of a population, where reproduction in each time step is proportional to the number of individuals. In such exponential growth, the population grows faster and faster, continuing to double in size at regular intervals. Exponential growth may be a good model for early stages of population growth, such as we can observe with a model for the initial growth of a bacteria population. However, as one can readily see by exploring some of the problems involving exponential growth, exponential growth cannot continue for long or a population will reach astronomical values. One reason that exponential growth cannot continue is because the environment in which a population lives cannot support an indefinitely large population of a given species. Based on the amount of available food, space, water, and other necessities, an environment will have a finite carrying capacity, which is the maximum population size that the environment can sustain indefinitely. As populations near their environmental limits, the growth rates decrease. The logistic model One way to develop a model that incorporates a carrying capacity is to make the reproduction be proportional not only to the population size but also to the fraction of unused carrying capacity. The resulting model is the logistic model for population growth. Because of the double proportionality, the annual increase is proportional to the product the population size and the unused carrying capacity: Logistic growth is similar to exponential growth when the population is small. In fact, for small population sizes, we can show that we get the equation for exponential growth back. Logistic and exponential growth. Illustration of how logistic and exponential growth agree for small population sizes and diverge as the population gets larger. You can use the buttons at the top to zoom in and out as well as pan the view. More information about applet. Such equation is the form of a difference equation, since the change is the difference between the population sizes. Sometimes, it is convenient to write the equation in alternate forms. We can multiply it out and then refactor the equation to put it into a similar form as the original one. But, we can make it look pretty by defining new parameters. Normalized function iteration form One can do the same trick to normalized the new form of the logistic equation.

### Chapter 5 : Exponential growth & logistic growth (article) | Khan Academy

*Logistic population growth occurs when the growth rate decreases as the population reaches carrying capacity. Carrying capacity is the maximum number of individuals in a population that the.*

Of course, it would be even easier to see with a graph. As it turns out, we can get a growth value from the charting process itself. Place your data in the format you see above and create an XY scatter chart - not a standard line chart. It makes a difference if your periods are other than 1, 2, 3 because a standard line chart treats each point as the 1st, 2nd, 3rd. A scatter chart actually reads the values in column A and treats them not as ordinal numbers but as actual values. Click on Add Trendline In the Add Trendline You must click the box near the bottom of the dialog box to Display Equation on chart as shown below. Here, we see the coefficient is 0. Notice that the CAGR formula gave us a growth rate of The two are different largely because CAGR used only the start and end periods in its calculations, where the curve fitting used all of the data. Goal Seek Method Again, we could certainly create predicted, actual and variance columns to see how well our curve fits the data. In fact, we could sum the differences and use Goal Seek to try to find out if another, better growth rate exists. The issue with merely summing the differences is that some predicted values will be greater and some smaller than actual values. Squares are always positive and a square will exaggerate big differences and ignore smaller differences. Excel just keeps trying to get warmer and warmer until nothing it tries gets any warmer. Here, the closest we can get our squares to zero is when the growth rate is You can see that different numerical methods give slightly different results. You may wish to try all three on your data to get a feel for the best approximation of period growth. Using the methods above, we can see that they all fail. You have a few options: Add a scalar to your values Unfortunately, the choice of scalar determines the growth. To put it clearly, if you add a small scalar - just a big enough number to bring the negative values positive - your growth rate will be very large. If you add a HUGE scalar - add one million to each of the periods shown above - your growth rate will be close the zero. This method is not going to yield meaningful results. Use polynomial or linear estimation Polynomial and linear estimation will be able to calculate an estimated change period over period, but these typically are not what we mean when we talk about growth rates. The equations given will be useful in projecting values a few periods into the future, and that may be good enough for your purposes. Using the methods above, analyse the two or more series separately and then recombine them. We hope you find this article useful and will contact us with your comments and questions. Development makes sure you get the most from your desktop productivity suite. Contact Us I Get It!

## Chapter 6 : Environmental carrying capacity - Math Insight

*How to Calculate the Sustainable Growth Rate In this Article: Calculating the Sustainable Growth Rate Applying the Sustainable Growth Rate Community Q&A A sustainable growth rate is the rate a business can increase its income without having to borrow more money from lenders or investors.*

The population of the United States changes on a continual basis. Knowing this rate of change is important to both the government and private businesses. The population growth or decline in an area can help a company decide where it wishes to locate its office, based on the potential amount of customers and employees alike. The trends could indicate the area is an expanding market, or a declining one, both valuable pieces of information. Choose the location for which you want to calculate the population growth rate. This could be for the entire United States, a specific region, state or smaller area, depending on the purpose of your calculation and how you will use that data. This example will focus on the city of Las Vegas, Nevada. Determine the years you want to compare. This could be the population growth rate from one year to another, or you might want to determine what the increase or decrease was over a longer span of time, such as 10 or even 50 years. Determine the population in the starting year for your population growth rate comparison. Census Bureau has a website with information to help you find these numbers for the location you are comparing see Resources. The starting population in Las Vegas, Nevada, for the year , according to the U. Census Bureau website, was , Determine the population for the ending date for the area. Once again, this can be found at the U. The population in Las Vegas in , according to the U. Subtract the population from your starting date from the population from your ending date. This will tell you how much the population has changed. A positive number indicates the population has grown, and a negative one indicates the population has dropped in that time frame. Take , Las Vegas population for and subtract , Las Vegas population for This gives you a positive change in population of 80, people. Divide your result in Step 5 by the population of your starting year. This will tell you the population rate growth or decline rate in a decimal form. Multiply it by to convert that rate to a percentage. In our example, divide the population change of 80, by the starting population of , This gives you a decimal answer of. Multiply this decimal by , and you have a positive population rate growth from to in Las Vegas of Warning Do not divide the difference you calculate between your starting and ending years by the population in the ending year. That will not provide you the percentage of increase or decrease from the starting year, instead it will use the ending year and provide an inaccurate statistic. About the Author Alan Kirk has been writing for online publications since

### Chapter 7 : Compound Annual Growth Rate (CAGR)

*While its housing capacity is more constrained than commercial and industrial uses, the Plan's capacity for growth considerably exceeds any realistic market requirements for the future. For example, there is sufficient capacity for retail and office commercial uses for over years even at optimistic, pre-recession, market growth rates.*

A population gains individuals by birth and immigration and loses individuals by death and emigration. Biotic Potential Populations vary in their capacity to grow. Populations cannot grow exponentially indefinitely. Exploding populations always reach a size limit imposed by the shortage of one or more factors such as water, space, and nutrients or by adverse conditions such as disease, drought and temperature extremes. The interplay of biotic potential and density-dependent environmental resistance keeps a population in balance. Determining the carrying capacities for most organisms is fairly straightforward. For humans carrying capacity is much more complicated. The definition is expanded to include not degrading our cultural and social environments and not harming the physical environment in ways that would adversely affect future generations. For populations which grow exponentially, growth starts out slowly, enters a rapid growth phase and then levels off when the carrying capacity for that species has been reached. The size of the population then fluctuates slightly above or below the carrying capacity. Reproductive lag time may cause the population to overshoot the carrying capacity temporarily. Reproductive lag time is the time required for the birth rate to decline and the death rate to increase in response to resource limits. In this scenario, the population will suffer a crash or dieback to a lower level near the carrying capacity unless a large number of individuals can emigrate to an area with more favorable conditions. The carrying capacity may be lowered by resource destruction and degradation during an overshoot period or extended through technological and social changes. An example of dieback occurred in Ireland after a fungus infection destroyed the potato crop in 1845. During this potato famine approximately 1 million people died and 3 million people emigrated to other countries. Increased food production due to improved agricultural practices, control of many diseases by modern medicine and the use of energy to make historically uninhabitable areas of Earth inhabitable are examples of things which can extend carrying capacity. The question is how long will we be able to keep increasing our population on a planet with finite size and resources? Population Impact Homo sapiens is a species possessing a diversity of individual needs. Thus, sub-populations will have different requirements and different impacts on the environment. For example million vegetarians will have a significantly different environmental impact than million meat-eaters. This can be demonstrated by comparing the affect on water supplies by both sub-populations. About 1000 tons of water are needed to produce 1 ton of grain. Add to this the amount of water that goes into the production of meat, and you can see that meat consumption places more stress on global water supplies than grain consumption. Consider the information in the list below and decide if the item is an indication that humans may have exceeded their carrying capacity in some regions.

### Chapter 8 : How to calculate average/compound annual growth rate in Excel?

*Calculate compound annual growth rate with XIRR function in Excel Actually, the XIRR function can help us calculate the Compound Annual Growth Rate in Excel easily, but it requires you to create a new table with the start value and end value.*

### Chapter 9 : Carrying Capacity

*Economically, capacity utilization is highly significant since economic analysts make use of capacity utilization indicators to predict the degree of inflation effects. A flourishing market leads to a rise in capacity utilization, and the reverse is also true.*