

Chapter 1 : Advantages and Disadvantages of Simulation - Concentric

Well, business simulation learning engagements can provide participants with immediate skills that will have direct impacts on business performance and improved business decision making. They provide participants with the opportunity to run and make decisions for a total business enterprise and understand the complete system of business.

The term simulation is used in different ways by different people. As used here, simulation is defined as the process of creating a model i. The Purpose of Simulation We frequently look into the future of mankind and see dangers Looking into the future may be one of the reasons that brains evolved in the first place. Richard Dawkins The underlying purpose of simulation is to shed light on the underlying mechanisms that control the behavior of a system. More practically, simulation can be used to predict forecast the future behavior of a system, and determine what you can do to influence that future behavior. That is, simulation can be used to predict the way in which the system will evolve and respond to its surroundings, so that you can identify any necessary changes that will help make the system perform the way that you want it to. For example, a fisheries biologist could dynamically simulate the salmon population in a river in order to predict changes to the population, and quantitatively understand the impacts on the salmon of possible actions e. That is, it allows you to ask "What if? Addressing Risk and Uncertainty Using Probabilistic Simulation Our knowledge of the way things work, in society or nature, comes trailing clouds of vagueness. Vast ills have followed a belief in certainty. Kenneth Arrow Nobel Laureate, Economics, Although simulation can be a valuable tool for better understanding the underlying mechanisms that control the behavior of a system, using simulation to make predictions of the future behavior of a system can be difficult. The objective of many simulations is to identify and quantify the risks associated with a particular option, plan or design. Simulating a system in the face of such uncertainty and computing such risks requires that the uncertainties be quantitatively included in the calculations. Deterministic Simulation Many simulation tools and approaches are deterministic. In a deterministic simulation, the input parameters for a model are represented using single values which typically are described either as "the best guess" or "worst case" values. Unfortunately, this kind of simulation, while it may provide some insight into the underlying mechanisms, is not well-suited to making predictions to support decision-making, as it cannot quantitatively address the risks and uncertainties that are inherently present. Probabilistic Simulation It is possible, however, to quantitatively represent uncertainties in simulations. Probabilistic simulation is the process of explicitly representing these uncertainties by specifying inputs as probability distributions. If the inputs describing a system are uncertain, the prediction of future performance is necessarily uncertain. That is, the result of any analysis based on inputs represented by probability distributions is itself a probability distribution. Such a result jn this case, quantifying the risk of extinction is typically much more useful to decision-makers who might utilize the simulation results. Monte Carlo Simulation In order to compute the probability distribution of predicted performance, it is necessary to propagate translate the input uncertainties into uncertainties in the results. A variety of methods exist for propagating uncertainty. One common technique for propagating the uncertainty in the various aspects of a system to the predicted performance and the one used by GoldSim is Monte Carlo simulation. In Monte Carlo simulation, the entire system is simulated a large number e. Each simulation is equally likely, and is referred to as a realization of the system. For each realization, all of the uncertain parameters are sampled i. The system is then simulated through time given the particular set of input parameters such that the performance of the system can be computed. The results of the independent system realizations are assembled into probability distributions of possible outcomes. Simulation software allows you to evaluate, compare and optimize alternative designs, plans and policies. As such, it provides a tool for explaining and defending decisions to various stakeholders. The ability to define what may happen in the future and to choose among alternatives lies at the heart of contemporary societies. Peter Bernstein, Against the Gods: The Remarkable Story of Risk Simulation should be used when the consequences of a proposed action, plan or design cannot be directly and immediately observed i. For example, when implementing a strategic plan for a company, the impacts are likely to take months or years to materialize. Simulation is particularly valuable when there is significant

uncertainty regarding the outcome or consequences of a particular alternative under consideration. Probabilistic simulation allows you deal with this uncertainty in a quantifiable way. Perhaps most importantly, simulation should be used when the system under consideration has complex interactions and requires the input from multiple disciplines. In this case, it is difficult for any one person to easily understand the system. A simulation model can act as the framework to integrate the various components in order to better understand their interactions. As such, it becomes a management tool that keeps you focused on the "big picture" without getting lost in unimportant details.

Types of Simulation Tools

Because simulation is such a powerful tool to assist in understanding complex systems and to support decision-making, a wide variety of approaches and tools exist. Many special purpose simulators exist to simulate very specific types of systems. For example, tools exist for simulating the movement of water and contaminants in an estuary, the evolution of a galaxy, or the exchange rates for a set of currencies. The key attribute of these tools is that they are highly specialized to solve a particular type of problem. In many cases, these tools require great subject-matter expertise to use. In other cases, however, the system being simulated may be so highly specified that using the tools is quite simple.

Other tools are not specialized to a particular type of problem. Rather, they are "tool kits" or general purpose frameworks for simulating a wide variety of systems. There are a variety of such tools, each tailored for a specific type of problem. What they all have in common, however, is that they allow the user to model how a system might evolve or change over time. Such frameworks can be thought of as high-level programming languages that allow the user to simulate many different kinds of systems in a flexible way.

Spreadsheets

Perhaps the simplest and most broadly used general purpose simulator is the spreadsheet. Although spreadsheets are inherently limited by their structure in many ways, other general purpose tools exist that are better able to represent complex dynamics, as well as provide a graphical mechanism for viewing the model structure.

Other general purpose tools exist that are better able to represent complex dynamics, as well as provide a graphical mechanism for viewing the model structure. Although these tools are generally harder to learn to use than spreadsheets and are typically more expensive, these advantages allow them to realistically simulate larger and more complex systems than can be done in a spreadsheet.

Discrete Event Simulators

These tools rely on a transaction-flow approach to modeling systems. Models consist of entities (units of traffic), resources (elements that service entities), and control elements (elements that determine the states of the entities and resources). Discrete simulators are generally designed for simulating processes such as call centers, factory operations, and shipping facilities in which the material or information that is being simulated can be described as moving in discrete steps or packets. They are not meant to model the movement of continuous material.

Agent-Based Simulators

This is a special class of discrete event simulator in which the mobile entities are known as agents. Whereas in a traditional discrete event model the entities only have attributes (properties that may control how they interact with various resources or control elements), agents have both attributes and methods. An agent-based model could, for example, simulate the behavior of a population of animals that are interacting with each other.

Continuous Simulators

This class of tools solves differential equations that describe the evolution of a system using continuous equations. These type of simulators are most appropriate if the material or information that is being simulated can be described as evolving or moving smoothly and continuously, rather than in infrequent discrete steps or packets. For example, simulation of the movement of water through a series of reservoirs and pipes can most appropriately be represented using a continuous simulator. Continuous simulators can also be used to simulate systems consisting of discrete entities if the number of entities is large so that the movement can be treated as a flow. A common class of continuous simulators are system dynamics tools, based on the standard stock and flow approach developed by Professor Jay W. Forrester at MIT in the early 1950s.

Hybrid Simulators

These tools combine the features of continuous simulators and discrete simulators. That is, they solve differential equations, but can superimpose discrete events on the continuously varying system. GoldSim is a hybrid simulator.

Chapter 2 : Business simulation - Wikipedia

Business simulation is simulation used for business training, education or analysis. It can be scenario -based or numeric -based. Most business simulations are used for business acumen training and development.

This is an exceptional survival role-playing game online, and gives you a striking, first-hand insight into extreme rural poverty, and the hardships and challenges faced by the millions of starving, struggling farmers and families of developing nations. In 3rd World Farmer, you have to make tough moral and survival decisions in order to provide for your underprivileged family, while enduring droughts, disease, poverty, corruption and war. Will you accept virtual money to survive in return for storing chemical waste, and even housing terrorists? Your proactive mission is to help the head of the family turn this small farm in a developing nation into a commercial success. You must carefully budget and decide which crops to grow each year to sustain your family, and grow. There are several crops to choose from corn, wheat, cotton and peanuts, and some prove more risky than others, providing potentially large earnings or huge losses. Make enough profit to invest in the necessary tools such as ploughs, harvesters and tractors to improve your crop yields. Increase your capital by investing wisely in essential buildings such as sheds, wells and barns. But remember, all investments have associated risks; wells can dry up, barns can be destroyed, and livestock may be stolen. Remember also - Do not become too greedy! Start from scratch and raise your hotel to a world-class standard. This game helps you to learn the essential skills of managing a business while also exercising your creative engineering side, as you have to construct your own hotel as you progress. This manager role-playing game is very effective in aiding your ability to multi-task, as well as testing how well you work under pressure. Build accessible rooms for your guests, manage finances and hire a staff to maintain the hotel. Burger Restaurant

Burger Restaurant is a fun, fast-food-making business simulation game where you get to make hamburgers, milkshakes and French fries for a living. They come out of nowhere and the atmosphere gets intense if they are waiting around for an order! You have to be Quick-On-Your-Toes to keep up! The goal of this restaurant manager simulation game is to help you learn how to run a successful food service business. Each day, you have a new challenge - a daily earnings target that you have to reach in order for your burger shop to survive. The icing, the sprinkles, the chocolate chips - yum yum Yum! You play the role of the young, aspiring cupcake management tycoon, and must ensure each dessert treat is prepared precisely the way each patron likes it! Happy cake-fed customers pay big virtual bucks - which you can then use to build and upgrade your diner into the most popular cupcakeria around! This fast-paced, role-playing management activity requires masterful multi-tasking skills, tremendous time-keeping abilities, and a talent for making snap decisions under pressure. Your busy schedule includes taking orders, choosing icing, baking cupcakes, decorating cupcakes, and serving customers all at the same time! You can also learn the essential real-life skills of good money management and organization while also perfecting the cute culinary art of cupcake making. Now, will you cave in under the intense pressure, or will you turn the running of your very own baking business into a piece of cake?

Airport Tycoon Airport Tycoon is a fun strategy game for high school students and older kids where you get to learn all about real-life money management strategies and tips, through managing an airport. This insightful learning game requires astute foresight, a determined attitude and a mind open to new ideas. If you do well, you will be rewarded with an overwhelming sense of achievement and purpose. The goal is to run the airport as efficiently as possible, in order to get the highest score. You have to decide on which changes to the airport are the most important. OK Big Shot, think you can handle the grueling demands and finer details of managing an airport? Remember, nothing sucks like bad management!

Frontier If you are a tycoon game enthusiast, prepare yourself for an epic economics and trade game set in an enthralling period in American history. Frontier takes you on an in-depth journey back in time to the Wild West, and the opportunity to choose between a life of dignified trade and nobility, or a life of thrills, spills and petty crime! Far from being just a place where pistols were easily drawn at dusk or dawn, the Frontier was an environment of rapid population growth and economic development, and was a catalyst for the formation of the United States. Frontier is essentially a very good business management-style strategy game with some

turn-based fighting thrown into the mix! You have to buy and sell goods, food, weapons, vehicles, and more, as you travel from town to town trying to become as successful and prosperous as possible. While you can opt to remain neutral, you can also choose to become a good guy the Enforcer to finally rid the lands of roaming outlaws, or one of the naughty bad guys the Buccaneers along the way. Smart decision making skills, strategic planning and multi-tasking abilities, as well as economic nous are all important attributes to have if you want to survive in this tough landscape, and increase your wealth money. The choice is yours Partner – remain a small fish in a one horse town, or travel the length and breadth of the nation in search of the American Dream! Either way, it sure is going to be a wild ride! Game Corp Game Corp is a highly interactive, entertaining and quirky business management simulation game for older kids, high school and college students, and grownups who enjoy online games that involve business themes and thinking strategy. In Game Corp, you take control of your very own awesome computer game development company! Starting from scratch, you have to hire good workers, manage projects, create new flash games, and gradually build your business up from a small-time, mini-game development outfit into a highly successful global corporation in the online game industry! Hire the brightest technical minds to produce fun games, choose the most popular genres, utilize fab modern technology, and have excited gamers from around the world flocking to try out your latest titles! If your games prove a success, you can sit back and watch the virtual money roll in! This interesting and challenging tycoon game is a good fun activity for practicing and testing out essential real-life business skills such as good money management, shrewd decision making and strategy planning, the ability to successfully motivate employees, and general project management skills. Your masterful multi-tasking skills are called into play as you react to fluctuating game market trends, and concentrate on a number of different projects at once. While some knowledge of online flash game genres is helpful, complete beginners and tycoon game newbies should also enjoy the fast-paced, mouse-clicking action! Can your company create sufficient enchanting games to be considered for the prestigious end of year Game Developer Awards? Happy team building and game developing! Sounds just like a job for a masterful multi-tasking professional! This highly interactive fast-food tycoon simulation game requires excellent time management skills, fast mouse-clicking ability, and a knack for making important decisions under intense pressure. Your customers will pay top dollar for quality hot dogs, and you can use these big bucks to upgrade your store, add to your menu, and attract more dog-loving patrons! Aside from the making of these delicious virtual snacks, you can also learn the essential real-life skills of shrewd business management and good customer service. Oiligarchy Get ready to find out all about the slippery business of oil, money and politics in this fun and thought-provoking entrepreneurial adventure. Oiligarchy is a very cool money management strategy game for older kids and teens where you play the role of a big-time Oil Tycoon, and have to earn as much virtual income as possible by drilling down into the land and extracting valuable crude oil. Quick reactions and cool decision making are important, as you have to react smartly to market trend changes, and adjust your business plans accordingly. Have you got the business acumen, savvy bargaining skills and determination to succeed in the highly competitive world of oil production? Can you multitask under great pressure, and manage multiple oil fields all at once? Will your "get rich" activities affect the global environment? This fun game helps you to think about and learn how to run a business efficiently. Can you cope in this high-pressure work environment? Running a restaurant is no joke. However, time is money! You need to keep a sharp eye on your earnings and expenses or you may go bust! You are the original entrepreneur and wheeler-dealer, starting off in a small business and working your way up to becoming a global tycoon superpower! Start off selling fruit and vegetables – then upgrade to giant oil fields and news corporations. The aim is pretty simple – make as much virtual money as you can and buy out every other business in town! Leave nothing to chance, and run your company efficiently to succeed. Your strategic planning and quick math calculation abilities will definitely be tested in this clever stock-broker activity. Are you potentially a real-life business magnate extraordinaire? Happy investing with solid business strategy! Zoo Builder You may already have tried your hand at online games where you play the role of a restaurant manager, garage or farm owner, real estate developer, and more. Zoo Builder is an awesome management simulation and construction game where you have to design, build, and supervise a busy city zoo. The position of Manager or Director can be very

challenging in any environment – even in an online flash game. Here, you must build your zoo from the ground upward in each level, hit various financial and structural targets, and give your expectant customers the best experience in town. You really must be on top of any potential weak points in your business. For example, if the monkey enclosure is just too small, build an extension to house more customers. Both tycoon game newbies and experienced business whiz gamers alike can enjoy the exciting action here. Mansion Impossible Have you got the skills to succeed in the highly competitive world of real estate and property sales? Mansion Impossible is a challenging business strategy simulation game for kids and teens where you have to speculate, develop an ever-changing property portfolio, and flip real estate buy and sell houses to make a profit. You play the role of a real estate magnate, and have the pickings of all of the new buildings in your local area. Your ultimate goal is to raise sufficient virtual money to buy the biggest mansion the prize asset in town! Raise funds by keeping an eye on trends in the property market, and timing escalating prices for some buildings. Then act swiftly yet calmly to sell your assets at exactly the right time to maximize profits. This fun and interesting tycoon game should help to aid your ability to multi-task, give you an appreciation of the intense pressures in the real estate market, as well as test how well you perform under that pressure. The ability to spot a bargain is a priceless skill in this game! Happy investing and success! NYC Mafiosi Want to play the role of Godfather for a day, the masterful Don of a New York crime family, and a shady entrepreneur who leaves nothing to chance? The year is 1929! the new America is gripped by a crippling recession, and alcohol prohibition is dominating the headlines. The only money to be made is in Speakeasys, bribery, and organized crime – and that is where you find yourself! NYC Mafiosi is a dramatic and in-depth tycoon and money management simulation game for teens and grown-ups where you play the role of a very shrewd mafia family business leader. Far from getting your hands dirty, you act as a kind of a business overseer, carefully planning and managing your various bars, shipments, gangsters, bribes, and more on a detailed and dangerous quest to take over all 5 New York City Boroughs! While this exciting, interactive business and entrepreneurial activity is based on the clearly dubious and corrupt principles of organized crime in the s, real-life business skills centered around good money management, profit-making and logistics can still be honed and learned. Building an empire requires ruthlessness, unwavering determination, and great patience when needed. Your ultimate goal is to create an awesome and profitable funfair filled with happy, loyal patrons! In order to become a theme park tycoon success, you need to exhibit astute business-related expertise in a variety of key areas.

Simulated environments allow you to test out new ideas before you make a complex business decision. This analysis technique lets you manipulate different parameters, such as revenue and costs, to.

Simulation is an approach that is used most commonly in two situations. The first situation is when uncertainty is high due to sparse data. One such example is a simulation of an ancient Native American tribe, the Anasazi, a culture that lived between the 9th and 14th centuries. It is hard to run typical analytics on the limited available data, so researchers use simulation to understand what happened to the tribe. A second common use of simulation is for experimentation in a low-cost, low-risk environment. Researchers at CERN simulate particles colliding in the Large Hadron Collider before they validate their forecasts in the expensive real-world collider in Switzerland. More common examples include airline pilots practicing on simulated flights and doctors learning on test patients. Both of these applications of simulation are helpful to scientists and researchers, but they come with a set of advantages and disadvantages. We have grouped these advantages and disadvantages into three broad areas related to technology, process, and socialization. The following table gives a summary of the advantages and disadvantages of simulation, which we elaborate below. Great forecasting power, but a good theory is needed Data analysis methods such as regression are limited to forecasting effects of events that are similar to what has already happened in the past. However, the model is likely to produce nonsensical results once it extrapolates to forecast what would happen if TV spend is doubled or if a new marketing channel is deployed. Simulation has an advantage over these methods in that it allows us to forecast things that have never happened before and to run scenarios outside of historical bounds. The caveat is that we need a good theory and causal hypotheses about how the system we are interested in analyzing works. Theories that have high predictive power, at least in social science, are hard to come by and may take years to develop. Flexible, but not standardized Simulations, and agent-based modeling in particular, provide highly flexible techniques for answering a wide range of research questions. These questions include what happened in the first moments of the Universe, how wind turbulence around aircraft works, how the World Wide Web evolves, or how to better design hospitals. Although simulation can be applied in a variety of contexts, a formalized set of rules and best practices is not always readily available. For this reason, simulation modeling especially in social science is incredibly creative, but may be daunting for new researchers who have no single reference to consult when starting out. Building a simulation does not require data, but validation does Simulation is an excellent approach to analyze problems when the available data is limited, since no data is necessary to construct a simulation. Validating a simulation, however, often requires multiple data sources to achieve a great degree of confidence in its representation of real-world dynamics. The process of validation is a disadvantage for simulation when comparing to data analytics approaches, since validating simulations is often more difficult. For example, if we wanted to simulate traffic on a road, we would not need any data to start. We could construct a simulation that incorporates modeled cars, driver behaviors, and road conditions and voila: Analysis of this traffic simulation could provide surprising insights such as the pattern of traffic jams migrating in the opposite direction that automobiles are traveling. But to test whether such insights are valid, we would need to use various data. We would seek information about road conditions in a range of contexts in cities, on highways, in the U. We could then recreate all of those scenarios within the simulation and see how well they match what actually happened in the real world. To get the simulations to match real-world outcomes, we need to change the theoretical rules guiding the simulation or test different assumptions until they do. Simulations have the benefit of forecasting multiple metrics simultaneously, but this can make it challenging to get all of the assumptions synchronized. One change may improve the forecast for one metric, but degrade the fit for another. Fortunately, expanding computing power and improving algorithms continue to reduce the time and effort to overcome the process barrier of calibrating and validating simulations. At the outset of a project, a team can often list off a broad range of hypotheses to test within the simulator. Once a simulation is built and what-if scenarios can be run, the desire to keep testing more and more scenarios often grows. Going back to the traffic simulation example, the initial goal of the

simulation might be to determine whether to replace 4-way-stops with roundabout intersections in a particular section of town. The questions may compound from there: What will the impact be of traffic lights in other parts of town? How should the signage be placed? Enabling a team to test and answer more questions is a great value-add that simulation provides. Projects may start by focusing on a single research question, but often grow to incorporate more complex ideas. This dynamic and creative process can build consensus by bringing more stakeholders to the table and ultimately lead to better decisions. Reaching agreement with the working team on the appropriate balance between focus on a specific deliverable and open-ended exploration is a good step to take early in the planning process. Low cost, but high skepticism Compared to the cost of experimenting in the real world, the use of simulation requires very little time and resources. In the meantime, our brand and business may have gone in an undesirable direction. The alternative to real world experimentation is to run simulations to test different marketing plans. Within minutes we can test many ideas before acting on a plan and making decisions in the real world. The disadvantage of this approach is that some audiences today are skeptical of simulation. Researchers often prefer these descriptive approaches to methods that test 31 theories about the future. We believe that this skepticism is a result of the relative novelty of simulation in marketing analytics, and that with more success stories and validated forecasts, this skepticism will subside. Innovative, but political Simulation may be one of the most innovative approaches researchers engage in today. We have seen people advance in their careers for their intra-preneurial spirit in introducing simulation within their organization. Longstanding and thorny problems get tackled every day with social simulation, but the socialization of simulation results often presents organizational challenges. Because it identifies trade-offs between a range of metrics, simulated insights may bring conflicting interests to the forefront in organizations where stakeholder incentives are not aligned. Building consensus around a simulation is done best when the process is organized from the start. In our experience, this is the best way to ensure that the simulation findings are impartial.

Chapter 4 : What is a Business Simulation? | PriSim

Cesim offers a range of comprehensive business simulation games for higher educational institutions and corporations to provide both educators and trainers with a state of the art online team environment, where participants can practice their business and decision-making skills.

Simulated environments allow you to test out new ideas before you make a complex business decision. This analysis technique lets you manipulate different parameters, such as revenue and costs, to discover opportunities for improvement in your current operations. Simulation models can give you a graphical display of information that can be edited and animated, showing you what might happen if you take certain actions. Applying these results to your business helps you manage risk and make better choices. Training An effective training simulation presents a realistic environment for users to experience complex situations and try out new techniques. For example, to teach users how to complete tasks using software used at your business, you can use free tools to capture screens, provide instruction and allow employees to practice taking the right steps to take to get work done. Other types of simulations present participants with a case study and require them to answer questions and make decisions. You can use simulations to teach corporate responsibility and ethics, business acumen and leadership. Additionally, free online games enable participants to create and run a company in a fun, competitive, multi-player environment. Process Improvement Simulation models of business processes help analysts examine business practices in order to improve them. A typical simulation model focuses on a specific aspect of your business, such as manufacturing or finance. By honing in on the details of how things work, you can pinpoint bottlenecks and try out new techniques to see if small changes can make a big impact. For example, you can use free online tools to diagram processes. By laying out the interdependencies of resources and animating their interaction, you often can see problems that go unnoticed when experienced in real time. Predicting Outcomes Using spreadsheets, you can simulate what might happen if certain conditions exist. This helps you generate more accurate forecasts. You can use your existing data and manipulate it based on potential changes, such as winning new deals or losing a major client. For example, use prior sales data to predict future sales and then use Google Docs to create a scatter plot with a trend line that shows the overall direction of the data. Managing Risk Manipulating data enables you to examine how much you can invest or afford to lose under certain simulated circumstances. For example, use a technique known as Monte Carlo simulation. The name refers chance events that occur in casinos. By supplying numbers representing uncertain inputs such as revenue and prices , you can track potential output and results. Using spreadsheet tools, for example, you can simulate cash flow, estimate return rates and risk of new product introductions, determine the risk of exchange rate fluctuations or determine investment strategies.

Chapter 5 : Business Simulations and Experiential Learning from BTS

Course aim. This course exposes students to practical decision making. Students work in teams to run all areas of a company using a business simulation.

The feedback from the participants was amazing. Not only was the simulation highly relevant to our business, but the BTS team really inspired and motivated the teams to excel. The competitiveness displayed was really quite remarkable. My employees were very engaged – it was substantially different from most of the "training" we have sponsored previously. We are already looking at "phase 2" of this activity. I would recommend BTS to anyone. Build Leadership, Project Management and Sales Capabilities While typical business simulations most often involve a series of data-driven input variables designed to engage the learner in the quantitative levers that impact business performance, in a scenario simulation, participants work with qualitative, branching story-lines that allow them to learn about best-practice decision making in leadership, sales and other important development areas. Our methodology teaches leaders what "great" looks like in their organization. Reality-based, progressive levels of complexity Artfully scripted Evaluated and measured Run and debriefed in a safe environment The most effective simulations are further customized to the competencies of employees and your learning objectives. BTS has customized scenario simulations for a wide range of clients and industries—from materials for leading consulting firms to disseminate to employees, to engagement management fundamentals that retailers can use for store manager and merchant leadership development. See how a leading company used a scenario simulation for big impact. Case Study Board Simulations: A Unique Approach to Learning A board simulation is a paper-based business simulation where participants manage a complex business unit or process and see where value is created as they make decisions and build business acumen. While generally known for business acumen applications, board simulations also have applications in soft-skills leadership development, and it is possible to build moments-based and scenario simulations in board format. Board simulations are a unique and highly effective experiential approach to learning: The most effective board simulations are customized to the client and industry. BTS has developed more than customized board simulation programs for global clients on six continents. We also offer a broad suite of standard industry simulations that may be adapted to specific client applications. Business models, competitive dynamics and strategic challenges vary dramatically from one industry to the next. And the pace of change is accelerating. To succeed, a deep understanding of industry fundamentals, financial levers, key challenges and trade-offs is critical for success. To build this understanding and provide a holistic perspective of a specific industry, BTS has developed Industry Simulations , a series of high impact, board-based programs. These simulations enable participating employees to experience the competitive dynamics, general trends, business challenges, interdependencies and profitability drivers that are unique to their industry. Industry Simulations Engage Maps An Engage Map is a tool that engages learners in a specific topic through discussion exercises and other activities. Engage Maps create opportunities for large numbers of executives, managers, and employees to understand the reasons for organizational change and to experience its implications.

Chapter 6 : Business simulations - Interpretive Simulations

We offer a range of comprehensive Business Management Simulation Games for higher education institutions and corporations to provide both educators and trainers with a state-of-the-art online team environment, where participants can practice their business and decision-making skills.

Systems theory is a way to view the world and it has influenced scientific, engineering as well as decision systems. Systems theory is used in this report as a paradigm for showing how systems work and how their elements relate together. Fredrick Taylor System behavior is expressed in formulations and characteristics where the analysis is based on its simplicity and the number of elements among other factors. R. Unity Auto Garage was established in by Mr. Rashid and a group of other directors driven by their ambitions to start up a user centered garage that would offer 24 hour service and at very friendly prices. In the garage cars arrive for general services involving engine check, wheel alignment, and general car servicing auto body repairs, engine repairs, and safety inspections among others. The cars arrive for service in a single line and serviced by a team of garage attendants mostly comprising of 3 service team members. It is expected that a car will arrive at least every 30 minutes. The estimated average service time is 20 minutes per car. Description and representation of basic concepts Mr. Rashid, the garage founder is in dilemma over various decision making issues and he therefore wishes to solve the following decision based problems regarding the garage using the systems theory: 1. Know the average number of cars in the garage system. 2. Know the average time for a car in the system 3. Know the average waiting time 4. Know the average number of cars in queue 5. Know the utilization factor 6. Find out the percentage idle time. The garage has a challenge of customers leaving if they find more than three cars on queue. The management wishes to know the probability that there will be more than three cars in the queue at a certain time. From the above scenario two key problems can be formulated for the garage. These are; 1. Establishing the utilization factor for staff members and service channels in the garage 2. Determination of the queuing discipline to deploy for customer service. Application of the systems theory is recommendable to Mr. Rashid in making the stated decisions. To do this, two systems theory approaches methods will be applied as follows; the analytical model to find out a solution for the first problem and a simulation model to find out a solution to the second problem. Since a system is majorly composed of interrelated elements working towards a common objective, the garage system has a number of elements that foster its success. The major elements in the system are the garage human resource, technological resources available, the number of cars entering the garage queue for service and the number of service channels available at the garage. There are various events that result into state changes in the garage system. These are; a car entering the queue system for service, a car entering a service channel or a car leaving the service channel after service. An increase in the number of cars in the queue will result in the demand for more staff and the need for more resources such as finances and time. On the other hand, this may affect the degree of customer satisfaction as customers may be forced to wait for long in the service queues. As indicated in the diagram an increase in cars on the queue will result in an increase in the garage staff team and overall this will call for more financial budgets and allocations. On the other hand, increase in service resources will lead to a reduction in the service time though the increase in resources means more financial expenditure for the garage. The diagram therefore suggests a negative feedback system for the garage. Use of Model building process 2. For instance it is expected that the arrival time will vary from a car to another. However, the pattern can be combined with oscillation to form a complicated system behavior. Formulation of objective Over and above answering the questions formulated in task 1, the system should also provide some loopback feedback to the garage management. Formulation of constraints There are a number of constraints anticipated in the deployment of the system. The constraints include the fact that the number of cars reporting to the garage is just but an estimate and therefore there may be more than or fewer cars joining the queue that stated. Finances in the system can be termed exogenous as they seem to affect other variables in the system yet they are affected by no other variable. Formulation of the assumption set There are various assumptions in the system. They include the assumption that the car arrival will be uniform after every 30 minutes. Another assumption in

the system is that the service queue opens immediately for the next car after the car in service leaves. This means no slack of time as an event commences soon after the other. This assumption may lead to weak decisions as a small change in some variables may affect the results of the system. The simple analytical model Construction of the analytical Model of the System: Other considerations to make are queue length and distribution and the service lines available. Analytical model application The analytical solutions Using the analytical model solutions to Mr. A Critical Evaluation of the Analytical Model: The average number of cars in the system in an hour has been identified as 2 per hour. Other answers provided for the problem include the service average time that the service station is busy, the probability that the facility is idle, as well as the average waiting time for service. The utilization factor analysis helps the management make a decision on whether to add another service station or not. The queuing discipline determines which customer is selected from the queue for processing or service when a server becomes available. Examples of different queuing disciplines are: This will help him understand the impact of changing a certain variable in the system. The result would be addition of another service line, while the number of cars visiting the garage for service still remains the same. From an analytical point of view the number of cars in the queue at a given time in the system would reduce and on the other hand the financial requirements would increase as a new staff team would be hired in place for the new service channel. This will mean faster service delivery to customers though the garage has to procure more finances for the new channel. A critical evaluation of the revised system The revised system helps the management in identifying critical decisions to be made. Through the revision of a certain system, various variables can be changed and therefore the results known in time. Rashid is able to tell what if the number of service channels was increased up to a certain level. Therefore it is very important to factor analytical models in real life systems from a revision perspective as there will always crop a new system and solutions to more questions. Constructing the Simulated system The system described in the scenario can be simulated as a discrete system. This means that the system constitutes of variables that change instantaneously at separated points in time. The system has various crucial events that govern the change of state and these are arrival of a car, a car entering service and a car departure. The system is discrete because it only changes when a car arrives for service, car enters for service or a car departs from service station. Time simulation To simulate time the next event time advance mechanism also known as event to event time advance will be used. In this case the simulation time will be initialized at zero, with the occurrence times for other events being determined by using probability methods since the occurrences anticipated will be random. The assumption is that at least one car will arrive in every 30 minutes. Inactivity periods will not be factored in this simulation as events follow each other therefore skipping inactivity time periods encountered by the system. The systems event graphs An event can be defined as an instantaneous occurrence that may change the state of a system. Determining the number of events in simulation sometimes may be challenging as well as specifying the state variables needed to keep the simulation running. Therefore for this system an event graph will help overcome these problems in my simulation as follows. A Critical Evaluation of the Simulation: As indicated in the above figure the arrival event can be scheduled initially and therefore schedules itself in the system. The other two events are scheduled by some preceding events somewhere. However the departure event may reschedule itself should the queue be very log for the customer to wait. Therefore there are strongly connected components in the simulation and these are; Car arrival Car arrival Car departure Car departure The events car arrival, Car entering the service point and car departing are not strongly connected however. The application of systems theory in business decision making is very crucial for approaching specific problems. The application of this enables a business know the cause and effect analysis of key elements of a system at work as well as the utilization factors associated. Through this an expression of the system overview is achieved and. Analytical methods involved help a business get the exact parameter of deployment for progressive performance. Simulation helps imitate the system and frame it in real world scenario perspectives. There are various queuing systems that can be applied at different levels and case scenarios. The choice of a good queuing system will help streamline operations and ensure quick service to customers in a business. Recommendation for further research could be analysis of queuing systems in multi service stations. Introduction to Queuing Theory 2nd edition. The solution manual pp, available online at Eitan

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Chapter 7 : Monte Carlo Simulation: What Is It and How Does It Work? - Palisade

Simulation is a decision analysis and support tool. Simulation software allows you to evaluate, compare and optimize alternative designs, plans and policies. As such, it provides a tool for explaining and defending decisions to various stakeholders.

We are constantly faced with uncertainty, ambiguity, and variability. Monte Carlo simulation also known as the Monte Carlo Method lets you see all the possible outcomes of your decisions and assess the impact of risk, allowing for better decision making under uncertainty. What is Monte Carlo Simulation? Monte Carlo simulation is a computerized mathematical technique that allows people to account for risk in quantitative analysis and decision making. Monte Carlo simulation furnishes the decision-maker with a range of possible outcomes and the probabilities they will occur for any choice of action.. It shows the extreme possibilities—the outcomes of going for broke and for the most conservative decision—along with all possible consequences for middle-of-the-road decisions. The technique was first used by scientists working on the atom bomb; it was named for Monte Carlo, the Monaco resort town renowned for its casinos. Since its introduction in World War II, Monte Carlo simulation has been used to model a variety of physical and conceptual systems.

How Monte Carlo Simulation Works Monte Carlo simulation performs risk analysis by building models of possible results by substituting a range of values—a probability distribution—for any factor that has inherent uncertainty. It then calculates results over and over, each time using a different set of random values from the probability functions. Depending upon the number of uncertainties and the ranges specified for them, a Monte Carlo simulation could involve thousands or tens of thousands of recalculations before it is complete. Monte Carlo simulation produces distributions of possible outcome values. By using probability distributions, variables can have different probabilities of different outcomes occurring. Probability distributions are a much more realistic way of describing uncertainty in variables of a risk analysis. Common probability distributions include:

- Values in the middle near the mean** are most likely to occur. Examples of variables described by normal distributions include inflation rates and energy prices.
- Lognormal Values** are positively skewed, not symmetric like a normal distribution. Examples of variables described by lognormal distributions include real estate property values, stock prices, and oil reserves.
- Uniform** All values have an equal chance of occurring, and the user simply defines the minimum and maximum. Examples of variables that could be uniformly distributed include manufacturing costs or future sales revenues for a new product.
- Triangular** The user defines the minimum, most likely, and maximum values. Values around the most likely are more likely to occur. Variables that could be described by a triangular distribution include past sales history per unit of time and inventory levels.
- PERT** The user defines the minimum, most likely, and maximum values, just like the triangular distribution. However values between the most likely and extremes are more likely to occur than the triangular; that is, the extremes are not as emphasized. An example of the use of a PERT distribution is to describe the duration of a task in a project management model.
- Discrete** The user defines specific values that may occur and the likelihood of each. An example might be the results of a lawsuit: During a Monte Carlo simulation, values are sampled at random from the input probability distributions. Each set of samples is called an iteration, and the resulting outcome from that sample is recorded. Monte Carlo simulation does this hundreds or thousands of times, and the result is a probability distribution of possible outcomes. In this way, Monte Carlo simulation provides a much more comprehensive view of what may happen. It tells you not only what could happen, but how likely it is to happen. Results show not only what could happen, but how likely each outcome is. This is important for communicating findings to other stakeholders. With just a few cases, deterministic analysis makes it difficult to see which variables impact the outcome the most. Using Monte Carlo simulation, analysts can see exactly which inputs had which values together when certain outcomes occurred. This is invaluable for pursuing further analysis. An enhancement to Monte Carlo simulation is the use of Latin Hypercube sampling, which samples more accurately from the entire range of distribution functions.

Monte Carlo Simulation with Palisade The advent of spreadsheet applications for personal computers provided an opportunity for professionals to use Monte Carlo

simulation in everyday analysis work. First introduced for Lotus for DOS in , RISK has a long-established reputation for computational accuracy, modeling flexibility, and ease of use. The introduction of Microsoft Project led to another logical application of Monte Carlo simulationâ€”analyzing the uncertainties and risks inherent to the management of large projects. RISK is also used for project management.

Chapter 8 : Introduction to Simulation Software - GoldSim

Sim Companies is a business simulation strategy game aimed at giving you the fun and experience of managing a company using real world economic principles. The goal of the game is to create a profitable and competitive business.

The most common term used is business game but several other terms are also in use. Here we will define the most common terms used in context of computer-based business learning environments. Klabbers [4] notes that gaming is sometimes associated with something that is frivolous, just for the fun of it. This hampers its scientific endeavor and the more serious connotations of gaming in the scientific arena. The term game is used to describe activities in which some or all of these characteristics are prominent: Games are played when one or more players compete or cooperate for payoffs, according to an agreed set of rules. Players behave as themselves though they may well display exceptional behavior. To be a discipline, simulation gaming needs a theory, methodology, and application and validation. Of these, forming a theory is the most difficult challenge. Similar comments come from Wolfe and Crookall. According to them this is unfortunate because the basis of any science is its ability to discriminate and classify phenomena within its purview, based on underlying theory and precepts. Without this, the field has been stuck, despite its age, at a relatively low level of development. In most cases, the terms business simulation game and management simulation game can be used interchangeably and there is no well-established difference between these two terms. The descriptions given for a management game, for example, by Forrester [12] and Naylor [13] do not differ from the previous. However, Elgood [5] determines that in a management game profit is not the dominant measure of success. Keys and Wolfe [14] define a management game as a simplified simulated experiential environment that contains enough verisimilitude, or illusion of reality, to include real world-like responses by those participating in the exercise. Gredler [15] divides experiential simulations into the following four categories: Data management simulations, Crisis management simulations, and Social-process simulations. Business simulation games are most often of the first kind. A participant in a data management simulation typically functions as a member of a team of managers or planners. Each team is managing a company allocating economic resources to any of several variables in order to achieve a particular goal. The game proceeds through several series of these interactive, iterative steps. As can be noted, this definition does not consider continuous real-time processing an alternative. In business simulation games players receive a description of an imaginary business and an imaginary environment and make decisions "on price, advertising, production targets, etc. A business game may have an industrial, commercial or financial background Elgood, Ju and Wagner [17] mention that the nature of business games can include decision-making tasks, which pit the player against a hostile environment or hostile opponents. These simulations have a nature of strategy or war games, but usually are very terse in their user interface. Other types of managerial simulations are resource allocation games, in which the player or players have to allocate resources to areas such as plant, production, operations, marketing, and human resources, in order to produce and sell goods. According to Senge and Lannon [18] in managerial microworlds "like business simulation games" unlike in the actual world, managers are free to experiment with policies and strategies without fear of jeopardizing the company. This process includes the kind of reflection and inquiry for which there is no time in the hectic everyday world. Thus, Senge and Lannon argue, managers learn about the long-term, systemic consequences of their actions. Such "virtual worlds" are particularly important in team learning. Managers can learn to think systemically if they can uncover the subtle interactions that thwart their efforts. Naylor [13] in gives quite a detailed view of the contents, structure, and operating of management games. Today, this description by Naylor is still valid for most of the business simulation games. Business simulation games are built around a hypothetical oligopolistic industry consisting of three to six firms, whose decision-makers or managers are the participants of the game. Each firm or team is allocated a specific amount of resources in the form of cash, inventories, raw materials, plant and equipment, and so forth. Before each operating period the players make decisions. Naylor mentions that these decisions can concern, e. This information is read into a computer that has been programmed on the basis of a set of mathematical models that provide a link between the operating results and

operating decisions of the individual firms, as well as the external environment the market. On the basis of a set of behavioral equations, such as demand and cost functions, and a set of accounting formulas that have been programmed into the computer, and b the individual decisions of each firm, operating results are generated by the computer in the form of printed reports " for example, profit and loss statements, balance sheets, production reports, sales reports, and total industry reports " at the end of each operating period. Usually the environment can be changed by the administrator of the game by altering the parameters of the operating characteristics of the game. In each case, the firms find it necessary to react according to the magnitude and the nature of the change imposed by the external environment. Naylor mentions that some of the more complicated and more realistic games even permit multiple products, plants, and marketing areas, stochastic production periods, stochastic demand, labor negotiations, and the sale of common stock. For more information about this topic see Lainema These games bore a vague similarity to the early 17th century chess. Military officers trained with war games in the s and s started to use their military training to manage civilian businesses. Some of the business game evolution can be traced to a Rand Corporation game, which simulated the U. Air Force inventory management within its supply system. According to Naylor, [13] the use of games in business and economics goes back to when the American Management Association developed the first so-called management decision-making game, called the Top Management Decision Game. Faria and Dickinson and Greenlaw et al. In this simulation five teams of players operated firms competing in a hypothetical, one-product industry. Teams made quarterly decisions covering price, production volume, budgets, research and development, advertising, and sales force and could request selected marketing research information. During the period only one or two new games appeared each year Faria, The summary includes 89 different business games or different versions of a certain business game developed by industrial firms, business associations, educational institutes, or governmental units. Naylor [13] mentions already in that hundreds of management games have been developed by various universities, business firms, and research organizations. These management games have been used both for research purposes and for training people in diverse disciplines such as management, business operation, economics, organization theory, psychology, production management, finance, accounting, and marketing. Also Faria and Dickinson note that the number of simulation games grew rapidly in the s. McRaith and Goeldner [22] list 29 marketing games, of which 20 had been developed by business firms and nine by academicians for university teaching. In Graham and Gray [23] listed nearly business games of different varieties. Horn and Cleaves [24] provided a description of business games. Faria [25] mentions that over simulations were in use in the United States in over 1, business schools. Overall, taking advantage of computer games in education increased enormously through the s to the s, see for example Ju and Wagner. At that point Faria also believes that there is a large and growing number of business schools instructors and business firm users of simulation games. Still, Faria estimated that only The penetration of business gaming in academia is fuelled by the following factors: Dickinson and Faria [27] state that in US over business games are being used by nearly 9, teachers at over 1, colleges offering business programmes. Larsen and Lomi [28] describe the shift of the objectives of management gaming. They state that until the early s simulation was used to forecast the behavior of a variety of sub-system level variables, ranging from the cash flow and financial performance of a company, to the inflation and unemployment rates of an economy. They state further, that during the last 15 years a new way of thinking about simulation emerged. Simulations could prepare for the future and reduce the sensitivity of possible strategies to changes in alternative frames of reference " or mental models. Larsen and Lomi further note, that the emphasis of computer-based simulation models has shifted: In the late s, training and consulting companies began designing and customizing business simulations for individual companies to augment their corporate leadership development programs. The business simulations often focused on strategy and business acumen. The business simulations allowed participants to test their decision-making skills, make mistakes, and safely learn from their experience. Some refer to this type of employee education as " experiential learning ". By , business simulations were available that blended the traditional business acumen financial skills with the softer " interpersonal " skills required for effective leadership development. Scenario simulations[edit] In a business game or business simulation game, a scenario is played out in a simulated environment and the

learner or user is asked to make individual or team based decisions on how to act in the simulations. Often multiple choice alternatives are used and the scenario is played out following a branching tree based on which decisions the learner makes. Throughout or at certain intervals feedback is provided. These are similar to role-play simulations. Numeric simulations[edit] A numeric simulation can mimic a whole company on a high level or it can be more detailed and mimic specific organizational units or processes. In a numeric simulation the learner or user makes decisions by pulling levers and dialers as well as through inputting numbers. The decisions are processed and the outcomes are calculated and shown in reports and graphs, e. Feedback is given throughout the simulation or at certain intervals, such as when a year has passed. Many numeric business simulations include elements of competition against other participants or against computer generated competitors. Types of business simulation games[edit] Business simulation games can be classified according to several properties. The first taxonomies were introduced already in the beginning of the s see e. Here we introduce the taxonomy from Biggs, [29] which is practically identical with the taxonomy from Greenlaw et al. Dimension Functional or Total enterprise Designed to focus specifically on problems of decision-making as seen in one functional area; OR Designed to give participants experience in making decisions at a top executive level and in which decisions from one functional area interact with those made in other areas of a firm. Competitive or Non-competitive Whether the decisions or participants influence the results of other participants or not. Interactive or Noninteractive In an interactive game participants respond to the questions at the computer, receive an immediate response, and then submit additional decisions. In a noninteractive game decisions are submitted to the game administrator. Industry specific or Generic In an industry specific game the authors attempt to replicate closely the actual industry. In generic games only general business relationships are replicated. Played by Individuals or by Teams Deterministic or Stochastic The stochastic alternative is probabilistic, including chance elements. Degree of complexity Two dimensions of complexity: When arguing for this, they most often refer to David A. Introduction to the game:

Chapter 9 : Beacon Simulation

Rankings of the best-performing companies worldwide on Overall Score, EPS, ROE, and Stock Price. New rankings each Monday.

Review decision and consequences Decision-making tools and techniques While the basic principles might be the same, there are dozens of different techniques and tools that can be used when trying to make a decision. Here are some of the more popular options, many of which use graphs, models or charts. You may want to use a combination of these techniques to arrive at your final decisions. A decision matrix is used to evaluate all the options of a decision. When using the matrix, create a table with all of the options in the first column and all of the factors that affect the decision in the first row. Users then score each option and weigh which factors are of more importance. A final score is then tallied to reveal which option is the best. This chart is used when weighing the plusses and minuses of the options. It ensures that all the positives and negatives are taken into consideration when making a decision. This is a graph or model that involves contemplating each option and the outcomes of each. Statistical analysis is also conducted with this technique. This is used when multiple people are involved in making a decision. It helps whittle down a large list options to a smaller one to the eventual final decision. This is a technique used when a large number of decisions need to be made. This helps in prioritizing which ones should be made first by determining which decisions will have the greatest overall impact. This technique is used when weighing the financial ramifications of each possible alternative as a way to come to a final decision that makes the most sense from an economic perspective. This is a method used by business leaders to determine consumer preferences when making decisions. SWOT stands for strengths, weaknesses, opportunities and threats, which is exactly what this planning tool assesses. An acronym for political, economic, social and technological, PEST can improve decision-making and timing by analyzing external factors. This method considers present trends to help predict the future ones. Decision-making mistakes There are a few common mistakes people make during the decision-making process that could result in a poor choice. Jeff Miller, the director of corporate training and development for human resources and business performance solutions provider Insperity, said that leaders often either rush decisions or procrastinate on making them. Business leaders often both over and underestimate the value of the information they receive from others. Instead of letting others sway your belief one way or another, the U. Small Business Administration advised leaders to keep the opinions of others in perspective. While you can and should consult expert advice on particularly difficult decisions, the SBA advises leaders not to rely too heavily on those opinions when evaluating their choices. Sammi Caramela Sammi Caramela has always loved words. Reach her by email, or check out her blog at sammisays. You May Also Like.