

1: Predictive analytics - Wikipedia

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Summary For the past decade, the U. Moreover, facing an agile, adaptive enemy means that Marines themselves must continually observe, learn, and adapt if they are to succeed. Page 2 Share Cite Suggested Citation: The National Academies Press. These evolving warfare concepts have dramatically changed the performance expectations of small unit leaders. Because of the considerable size of the areas of operations assigned to small units and the need to respond quickly to an agile and adaptive adversary, small unit leaders—company, platoon, and squad leaders—now frequently find themselves isolated in both space and time, with little ability to reach back to higher headquarters for timely guidance or expert assistance. Because of the need for small units to operate semiautonomously over long periods of time, their responsibilities typically go far beyond what has been traditionally expected of a small unit tightly integrated into a larger-sized organization and may include the coordination of supporting arms, logistics planning, intelligence interpretation, and even civil affairs. The complex environments in which Marines have had to operate have also added the demand that small unit leaders possess skills heretofore not considered critical to the traditional expeditionary warfare mission of the Marine Corps. This component calls on capabilities including the following: See Appendix D for the typical size and organization of these small units. The phrase was first used by the British Army during the Malayan Emergency in , but the concept has been with us since the time of Alexander. It is mentioned here not because it is new, but because it demands skills and sophistication on the part of the small unit leader not normally called for in combat operations. Page 3 Share Cite Suggested Citation: Moreover, these decisions are almost always constrained by rules of engagement, considerations of unit capability, location, and mission priority. They are frequently made under great stress and always with incomplete, confusing, or inaccurate information. Such decisions involve difficult trade-offs between outcome and effects. More casualties might be required for mission success. Additional resources might need to be expended to reduce casualties. Accessed August 26, Priorities for 21st Century Defense, Washington, D. Page 4 Share Cite Suggested Citation: The number of trade-offs is almost endless. Indeed, while the committee was able to examine in part the operational environment, existing abilities, and gaps for small unit leaders as requested in the first bullet item of the terms of reference , 13 these constantly shifting variables made it difficult for the committee to develop recommendations consisting of the operational and technical approaches for improving the decision making abilities of small unit leaders as requested in the fourth bullet item of the terms of reference. Over time, these reports form an accurate picture of the decision making ability of a Marine leader. The committee could find no way to improve on this tried-and-true method. At the same time, however, small unit leaders are still overcoming a set of institutional hurdles with respect to their selection and training and the support that they receive, and their role in the operational environment is changing as well, given the evolving and complex nature of that environment. Here, the committee has endeavored to identify the major challenges facing small unit leaders and the Marine Corps, and trusts that its recommendations offer some useful solutions to addressing these challenges. Its data gathering included the limited interviews that a subgroup of the committee conducted with a number of Marine small unit leaders who had recently returned from deployment to Iraq and Afghanistan the interview protocol is presented in Appendix E. Page 5 Share Cite Suggested Citation: Marine Corps lacks up-to-date descriptions and requirements that define the job responsibilities of small unit leaders company commanders, platoon leaders, and squad leaders , making it difficult to provide job-appropriate training and preparation for them. Furthermore, despite the fact that small unit leaders are assuming significant responsibilities, the Marine Corps has not established an institutional selection process for the positions of company commander and squad leader. Assess the pros and cons of establishing a Corps-wide process for the selection of squad leaders and company commanders. Such a process does not need to be centralized, but any form of implementation should be undertaken consistently across the Marine Corps. Continue to monitor progress in the development and validation of psychometric and

physiologically based indicators that may have mid- and long-term potential to enhance selection. After completing their training at the Basic School, infantry officers attend the Infantry Officers School, and other officers attend schools of varying length in their occupational specialties. Their standing in these schools serves as the criteria for their selection as platoon leaders, since they have no operational experience. Page 6 Share Cite Suggested Citation: In addition, at the time that the committee was conducting its review, the Corps had not identified a responsible organization to ensure that such training and education programs are properly developed, staffed, operated, and evaluated for their efficacy. Continue to develop and implement in-garrison and predeployment team training techniques and opportunities to increase the sensitivity and timeliness of small unit training with respect to rapidly evolving hybrid warfare issues. Training must evolve in tandem with the rapidly changing combat environment. However, the Systems Approach to Training relies on a 2-year cycle for evaluating and restructuring formal training practices. Given the rapid evolution of the combat environment, the penetration of knowledge from the battlefield into predeployment training is much too slow. In addition, the traditional mechanisms of the Marine Corps for capturing and transferring experiential knowledge, such as lessons learned, cannot keep pace with the evolution of operations. Marine small units are addressing this problem in-theater by developing training scenarios that exercise skills deemed necessary for the battlefield. Support small units with in-theater training by adapting training and delivery methods and employing appropriate technologies: For example, computer-based scenarios might be developed, then modified by small unit leaders in reaction to changing missions and tactical circumstances. Page 7 Share Cite Suggested Citation: Marine companies and their constituent small units are assuming responsibilities analogous to those of a battalion but are not provided adequate personnel or material support for critical functions, including logistics, intelligence, communications, and information technology. Provide primary or collateral billets at the company level to perform the functions of logistics, civil affairs, and operations and communications. Develop and provide courses of instruction that are scaled to the company level and tailored to these staff functions. Small unit leaders lack adequate information and analytic support for the cognitive work of sensemaking and situational assessment. In particular, problems with intelligence collection and dissemination, coupled with the paucity of working communications equipment, inadequate bandwidth, and delays in response times from higher levels of command, are detrimental to both decision making and morale at the small unit level. In addition, delays associated with the formal capture, recording, and transfer of theater-related experiential knowledge such as through lessons learned make it difficult for deployed units to benefit from the recent experiences of other Marines. Provide technical and engineering solutions to support the small unit leader through well-tailored human-centric products for supplementing limited manpower in order to improve connectivity, information integration, and aids to decision making. Marine small units and their leaders have spent the past decade conducting distributed operations in hybrid environments, facing a determined and observant insurgency while conducting a range of humanitarian, stabilization, and reconstruction activities. As they return to garrison, small units and their leaders bring with them a wealth of knowledge about these environments, as well as key insights into what tools, technologies, training, and other support elements are most important for the successful conduct of operations. Without mechanisms to capture and build on the unique experiential knowledge of small unit leaders, the Marine Corps could easily lose this tremendous resource. Consider ways to engage experienced junior enlisted leaders so that they can continue in a leadership role and the Marine Corps can benefit from their leadership expertise. For example, include junior enlisted leaders with hybrid ECO deployed experience to support the following: Established and emerging research in human cognition and decision making is highly relevant to developing approaches and systems that support small unit decision making. Cognitive psychology can provide significant guidance in developing technologies that support the decision maker, including approaches to information integration, tactical decision aids, and physiological monitoring and augmented cognition. However, technologies that do not incorporate human-centered design methodsâ€”such as those of cognitive systems engineeringâ€”may not generate useful and usable in-theater decision aids for the small unit leader. Lastly, the emerging field of cognitive neuroscience may have significant potential for developing the understanding of the fundamental neurophysiological mechanisms underlying human decision making. Although research in this area is very

new, over the next few decades it may generate a fundamental paradigm change in scientific approaches to understanding human perception, sensemaking, and decision making. Continue to invest in and leverage promising areas of science and technology research in the near term, midterm, and far term to enhance the decision making performance of small unit leaders. Page 9 Share Cite Suggested Citation: Page 1 Share Cite Suggested Citation:

2: Boundary Dam Carbon Capture and Storage | Global Carbon Capture and Storage Institute

I think the easiest way to capture decisions is in a publicly viewable document; you can categorize them, starting with major decisions (like technologies or features), and putting sections for other areas for people who care (eg. finance decisions, technology decisions).

Definition[edit] Predictive analytics is an area of statistics that deals with extracting information from data and using it to predict trends and behavior patterns. The enhancement of predictive web analytics calculates statistical probabilities of future events online. Predictive analytics statistical techniques include data modeling, machine learning, AI, deep learning algorithms and data mining. For example, identifying suspects after a crime has been committed, or credit card fraud as it occurs. It is important to note, however, that the accuracy and usability of results will depend greatly on the level of data analysis and the quality of assumptions. Predictive analytics is often defined as predicting at a more detailed level of granularity, i. This distinguishes it from forecasting. For example, "Predictive analytics" Technology that learns from experience data to predict the future behavior of individuals in order to drive better decisions. Define the project outcomes, deliverable, scope of the effort, business objectives, identify the data sets that are going to be used. Data mining for predictive analytics prepares data from multiple sources for analysis. This provides a complete view of customer interactions. Data Analysis is the process of inspecting, cleaning and modelling data with the objective of discovering useful information, arriving at conclusion Statistics: Statistical Analysis enables to validate the assumptions, hypothesis and test them using standard statistical models. Predictive modelling provides the ability to automatically create accurate predictive models about future. There are also options to choose the best solution with multi-modal evaluation. Predictive model deployment provides the option to deploy the analytical results into everyday decision making process to get results, reports and output by automating the decisions based on the modelling. Models are managed and monitored to review the model performance to ensure that it is providing the results expected. Types[edit] Generally, the term predictive analytics is used to mean predictive modeling , "scoring" data with predictive models, and forecasting. However, people are increasingly using the term to refer to related analytical disciplines, such as descriptive modeling and decision modeling or optimization. These disciplines also involve rigorous data analysis, and are widely used in business for segmentation and decision making, but have different purposes and the statistical techniques underlying them vary. Predictive models[edit] Predictive models are models of the relation between the specific performance of a unit in a sample and one or more known attributes or features of the unit. The objective of the model is to assess the likelihood that a similar unit in a different sample will exhibit the specific performance. This category encompasses models in many areas, such as marketing, where they seek out subtle data patterns to answer questions about customer performance, or fraud detection models. Predictive models often perform calculations during live transactions, for example, to evaluate the risk or opportunity of a given customer or transaction, in order to guide a decision. With advancements in computing speed, individual agent modeling systems have become capable of simulating human behaviour or reactions to given stimuli or scenarios. The available sample units with known attributes and known performances is referred to as the "training sample". The units in other samples, with known attributes but unknown performances, are referred to as "out of [training] sample" units. The out of sample units do not necessarily bear a chronological relation to the training sample units. For example, the training sample may consist of literary attributes of writings by Victorian authors, with known attribution, and the out-of sample unit may be newly found writing with unknown authorship; a predictive model may aid in attributing a work to a known author. Another example is given by analysis of blood splatter in simulated crime scenes in which the out of sample unit is the actual blood splatter pattern from a crime scene. The out of sample unit may be from the same time as the training units, from a previous time, or from a future time. Descriptive models[edit] Descriptive models quantify relationships in data in a way that is often used to classify customers or prospects into groups. Unlike predictive models that focus on predicting a single customer behavior such as credit risk , descriptive models identify many different relationships between customers or products. Descriptive models

do not rank-order customers by their likelihood of taking a particular action the way predictive models do. Instead, descriptive models can be used, for example, to categorize customers by their product preferences and life stage. Descriptive modeling tools can be utilized to develop further models that can simulate large number of individualized agents and make predictions. Decision model Decision models describe the relationship between all the elements of a decision—the known data including results of predictive models, the decision, and the forecast results of the decision—in order to predict the results of decisions involving many variables. These models can be used in optimization, maximizing certain outcomes while minimizing others. Decision models are generally used to develop decision logic or a set of business rules that will produce the desired action for every customer or circumstance. Applications[edit] Although predictive analytics can be put to use in many applications, we outline a few examples where predictive analytics has shown positive impact in recent years. Analytical customer relationship management CRM [edit] Analytical customer relationship management CRM is a frequent commercial application of predictive analysis. Methods of predictive analysis are applied to customer data to pursue CRM objectives, which involve constructing a holistic view of the customer no matter where their information resides in the company or the department involved. CRM uses predictive analysis in applications for marketing campaigns, sales, and customer services to name a few. These tools are required in order for a company to posture and focus their efforts effectively across the breadth of their customer base. Several of the application areas described below direct marketing, cross-sell, customer retention are part of customer relationship management. Child protection[edit] Over the last 5 years, some child welfare agencies have started using predictive analytics to flag high risk cases. Additionally, sophisticated clinical decision support systems incorporate predictive analytics to support medical decision making at the point of care. A working definition has been proposed by Jerome A. It encompasses a variety of tools and interventions such as computerized alerts and reminders, clinical guidelines, order sets, patient data reports and dashboards, documentation templates, diagnostic support, and clinical workflow tools. They employed classical model-based and machine learning model-free methods to discriminate between different patient and control groups. Collection analytics[edit] Many portfolios have a set of delinquent customers who do not make their payments on time. The financial institution has to undertake collection activities on these customers to recover the amounts due. A lot of collection resources are wasted on customers who are difficult or impossible to recover. Predictive analytics can help optimize the allocation of collection resources by identifying the most effective collection agencies, contact strategies, legal actions and other strategies to each customer, thus significantly increasing recovery at the same time reducing collection costs. Cross-sell[edit] Often corporate organizations collect and maintain abundant data e. Customer retention[edit] With the number of competing services available, businesses need to focus efforts on maintaining continuous customer satisfaction, rewarding consumer loyalty and minimizing customer attrition. In addition, small increases in customer retention have been shown to increase profits disproportionately. Proper application of predictive analytics can lead to a more proactive retention strategy. Silent attrition, the behavior of a customer to slowly but steadily reduce usage, is another problem that many companies face. Predictive analytics can also predict this behavior, so that the company can take proper actions to increase customer activity. Direct marketing[edit] When marketing consumer products and services, there is the challenge of keeping up with competing products and consumer behavior. Apart from identifying prospects, predictive analytics can also help to identify the most effective combination of product versions, marketing material, communication channels and timing that should be used to target a given consumer. The goal of predictive analytics is typically to lower the cost per order or cost per action. Fraud detection[edit] Fraud is a big problem for many businesses and can be of various types: Some examples of likely victims are credit card issuers, insurance companies, [26] retail merchants, manufacturers, business-to-business suppliers and even services providers. Predictive modeling can also be used to identify high-risk fraud candidates in business or the public sector. Mark Nigrini developed a risk-scoring method to identify audit targets. He describes the use of this approach to detect fraud in the franchisee sales reports of an international fast-food chain. Each location is scored using 10 predictors. The 10 scores are then weighted to give one final overall risk score for each location. The same scoring approach was also used to identify high-risk check kiting accounts, potentially fraudulent travel agents, and questionable

vendors. A reasonably complex model was used to identify fraudulent monthly reports submitted by divisional controllers. This type of solution utilizes heuristics in order to study normal web user behavior and detect anomalies indicating fraud attempts. Portfolio, product or economy-level prediction[edit] Often the focus of analysis is not the consumer but the product, portfolio, firm, industry or even the economy. For example, a retailer might be interested in predicting store-level demand for inventory management purposes. Or the Federal Reserve Board might be interested in predicting the unemployment rate for the next year. These types of problems can be addressed by predictive analytics using time series techniques see below. They can also be addressed via machine learning approaches which transform the original time series into a feature vector space, where the learning algorithm finds patterns that have predictive power. Project risk management When employing risk management techniques, the results are always to predict and benefit from a future scenario. The capital asset pricing model CAP-M "predicts" the best portfolio to maximize return. Probabilistic risk assessment PRA when combined with mini- Delphi techniques and statistical approaches yields accurate forecasts. These are examples of approaches that can extend from project to market, and from near to long term. Underwriting see below and other business approaches identify risk management as a predictive method. Underwriting[edit] Many businesses have to account for risk exposure due to their different services and determine the cost needed to cover the risk. For example, auto insurance providers need to accurately determine the amount of premium to charge to cover each automobile and driver. For a health insurance provider, predictive analytics can analyze a few years of past medical claims data, as well as lab, pharmacy and other records where available, to predict how expensive an enrollee is likely to be in the future. Predictive analytics can help underwrite these quantities by predicting the chances of illness, default , bankruptcy , etc. Predictive analytics can streamline the process of customer acquisition by predicting the future risk behavior of a customer using application level data. Proper predictive analytics can lead to proper pricing decisions, which can help mitigate future risk of default. Technology and big data influences[edit] Big data is a collection of data sets that are so large and complex that they become awkward to work with using traditional database management tools. The volume, variety and velocity of big data have introduced challenges across the board for capture, storage, search, sharing, analysis, and visualization. Examples of big data sources include web logs , RFID , sensor data, social networks , Internet search indexing, call detail records, military surveillance, and complex data in astronomic, biogeochemical, genomics, and atmospheric sciences. Big Data is the core of most predictive analytic services offered by IT organizations. Regression techniques[edit] Regression models are the mainstay of predictive analytics. The focus lies on establishing a mathematical equation as a model to represent the interactions between the different variables in consideration. Depending on the situation, there are a wide variety of models that can be applied while performing predictive analytics. Some of them are briefly discussed below. Linear regression model[edit] The linear regression model analyzes the relationship between the response or dependent variable and a set of independent or predictor variables. This relationship is expressed as an equation that predicts the response variable as a linear function of the parameters.

3: Transforming Value Chains in Process Industries with Digital and AI

Why the decision was made (including why the alternatives were rejected) How the decision was made (including links to supporting data or details) In LiquidPlanner, the project details page is the natural place to log this type of information.

Building institutional memory 5. The two main issues with capturing that knowledge have been the lack of a consistent format and process to capture it. FICO has been working very closely with the Object Management Group, a standards body, to create a standard for documenting decisions. The DMN standard includes notation initially proposed by Dr. DMN helps organizations articulate decisions, making them more transparent and improving collaboration. Decision Requirements Analysis Workshop. A DRAW session brings all key stakeholders in a process together to understand the subject matter expertise they hold and to document it. DRAW is fundamentally a scoping exercise; it defines the extent and structure of a domain of decision-making and documents it with DMN. In this way, the expertise that is held in the collective minds of multiple people is codified in a clear, visual representation. Notably, these DMN diagrams tend to fit on one page, even when the associated decisions require tens of thousands of rules to be made. This high-level summary helps everyone involved “now and in the future” clearly understand the decision being made. The DRAW process translates into more innovation, delivered faster, and a quicker improvement cycle. Medscheme came to FICO for help in re-engineering their healthcare claims assessment system, which had thousands of rules, and hundreds of thousands of data reference records. The goal at this stage of the project was to document the entire process, simplify it, and create an RFP for a complete system redesign. Medscheme has an extremely complex set of decisions and data to get the outcome they desire. They need to assess claims, and determine who should be paid and how much for any given set of treatment. The DMN documents decision requirements, making them easily understandable by both business and technical users. An elegantly simple, graphical model, it contains deep understanding of the business issues at hand and the details of the key elements behind those decisions. The decision models were highly complex and the notation language helped the team to visualize all the key elements and scope the RFP process. DMN makes it far easier for vendors to provide accurate bids, since scoping and pricing a decision automation project requires a deep understanding of the complexity of the business knowledge to be encapsulated in the system rules, calculations, etc. Because DMN is an open, international standard, Medscheme could provide the results to all potential vendors as the specification of scope. It also allows the domain to be broken down into partitions for planning a phased project. FICO identified three reusable decision services adjudication, pricing and benefits, which will be used in different combinations in three different processes claim, pre-approval and quotation. As a footnote, I am delighted that FICO has been selected to help with the next phase of the claims re-engineering project. To learn more about DMN:

4: Home - Supreme Court of the United States

Capturing Decisions and Rationale from Collaborative Design 3 's, F. Baker at IBM promoted the idea of a "chief programmer team" [3] in which one extremely talented programmer wrote all of the software.

In a world where business units are becoming more self sufficient and knowledgeable about managing their overall processes through the use of technology, it becomes more important to identify the value of data and its interaction. The ability to break down concepts and understand how things work enables business units to build and manage applications on their own. Alternatively, this knowledge allows executives to understand how disparate business units function and what IT needs in order to do their jobs and develop effective end user applications. With the increasing ability to deploy solutions without the aid of IT, organizations may be asking, why is knowing about data and its infrastructure important? Why data matters The reality is that even though executives may not require this knowledge for their day-to-day tasks, understanding how data interrelate only increases their ability to link information, performance, and strategy more effectively. By identifying how business processes and operations link to data, organizations can turn that data into information that can be used for decision making purposes. For instance, many organizations use different sources of information for planning, trends analysis, and managing performance. Consequently, the value of the information is only as good as its point of entry into the system. This means that when decision makers across the organization are analyzing different numbers in order to make decisions that will affect the company, and the information does not add up the blame for why these numbers are invalid lies at the point of entry of the information into the operational systems. However, if data quality control initiatives exist particularly with respect to the data that is used to drive decision making, the picture changes as a broader and more correct view of the information becomes available. Within business intelligence applications the idea of bringing in the right data at the right time becomes critical to reporting and analysis applications. Without accurate information, the data being analyzed and reported on becomes meaningless. A general overview of how data integration works will provide an outline for decision makers who want a better understanding of how information is gathered to help with the decision making process. How it works source: For business intelligence applications i. The first step is the identification of what data is required and where it resides. For instance, customer sales may exist in several systems across the organization. It becomes important to identify where the best access point is to capture the information. Once the data is identified it is copied i. On a separate note, data integration can also be used for purposes outside of business intelligence including consolidating organizational information due to acquisitions, master data management initiatives, and integrating data from legacy systems into ERP and CRM systems. As an extension of simple integration activities such as ETL extract transform and load the ability to perform CDC change data capture and EII enterprise information integration activities also exist. Change data capture CDC simply involves capturing only the updated data fields. Instead of re-capturing source data each time updates are performed, only new entries are updated, thus saving time and space. Enterprise Information Integration EII on the other hand, provides a single interface to data to see a single view of information within the organization. The Informatica diagram below shows the process involved in data integration activities. Once data is brought into a data warehouse or captured for reporting or in a dashboard, executives can gain a fuller and broader view of what is happening within the organization. The bottom line for business Understanding how information is tied together and how each piece of the data puzzle interrelates to form the big picture enables better decision making, higher process efficiencies and can lower overall costs. As organizations continue to struggle to maintain competitive advantage, information becomes the key component in enabling executives and decision makers to make informed decisions based on a degree view of the organization and its various operational processes. About the Author Lyndsay Wise is an industry analyst for business intelligence. For over seven years, she has assisted clients in business systems analysis, software selection and implementation of enterprise applications. Lyndsay is a monthly columnist for DMReview and conducts research of leading technologies, products and vendors in business intelligence, marketing performance management, master data

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5: Create a process documentation guide

u is a binary decision variable that is set to 1 when the capture unit is installed and 0 when it isn't and *vt* is a decision variable that indicates whether the capture unit is switched on/off in year *t*. *u* and *vt* are related in that $u = 0$ if and only if $vt = 0$ for all *t*.

Digital technologies—particularly predictive analytics and other artificial intelligence AI applications that run on cloud-based digital and data platforms—can help industrial manufacturers master that complexity, rethink their value chains, and, thus, avoid having to make such compromises. These new solutions, which are more easily implemented than traditional IT applications, are modular, so they can be built incrementally. This capability means that organizations can start generating new insights and extracting value from their data within a few months: To make the gains sustainable, companies need to put the right supporting structure in place. Still, to make the gains sustainable, companies need to put the right supporting structure in place. Specifically, we see three crucial elements: By transforming complex value chains through digital, industrial companies have the opportunity to improve EBITDA by 2 to 4 percentage points and reduce inventory by up to ten days. Furthermore, these initiatives help companies connect far more directly with their customers, dramatically improving their service levels. Complexity Leads to Compromises and Lost Value Industrial organizations, such as chemical, steel manufacturing, and mining companies, have highly intricate value chains, which are becoming even more complex. In addition, many of them face external pressures from, for example, increasing competition and regulatory requirements. Complexity leads to operational compromises: Managers optimize production plants at the local level rather than in accordance with company-wide standards. Companies cannot capitalize on the demand for higher-market products and services because they cannot achieve the correspondingly higher service levels required. Production plans are based on inaccurate forecasts, and companies can neither respond swiftly to last-minute deviations from the plan nor mitigate risk. And an incomplete system view leads to bottlenecks throughout. The end result is a significant loss of value. The Digital Value Chain New digital technologies use five levers to enable companies to break away from these traditional compromises and to significantly improve their value chain performance: Integrating insights and data throughout the value chain to generate a single, system-wide view Managing vast amounts of data at the most granular level to help business leaders master complexity and understand root causes Improving planning accuracy through predictive analytics and simulations that allow companies to anticipate problems Understanding the full impact of decisions so that managers can focus on them rather than on technical actions Making data accessible to generate insights in real time—when they are most useful to the business units For example, predictive algorithms based on machine learning can be used to analyze historical demand and the external factors that have influenced it, allowing companies to generate better plans and adapt to meet market demands. By simulating supply chain performance and the impact of decisions across the value chain, the tools can identify the probability and impact of risks, such as production bottlenecks, and suggest ways to avoid them. Using Predictive Analytics to Improve Demand Forecasting Demand forecasting is a common application of predictive analytics. AI techniques can significantly enhance the accuracy and richness of demand forecasts in two ways. First, the underlying algorithms learn from such factors as seasonality and trends. Second, AI techniques can make correlations with external factors that are affecting customer markets. AI-generated models learn from historical data and are back-tested to ensure accuracy. The algorithms adjust over time on the basis of real-world results, continuously improving their accuracy. The models can be set up in as little as 8 to 12 weeks, and they are ultimately integrated into daily processes and decision making. Companies that have applied predictive analytics have improved the accuracy of their overall demand forecasts by up to 20 percentage points, leading to reductions in inventory levels, increased sales of high-margin products, and better overall customer service. Exhibits 1 and 2 illustrate the differences between a traditional demand-forecasting approach and one that is powered by predictive analytics. An Agile Approach to Value Perhaps the most significant aspect of these new technologies is that they can be deployed in an agile way using targeted modular solutions rather than traditional methodologies for large IT implementations.

Companies can implement a data and analytics layer next to existing IT systems and begin consolidating and making sense of data that is spread across different legacy systems. This approach sets business needs ahead of the technology, rather than the other way around. The Power of Digital and Data Platforms At many companies, the biggest problem is not a lack of data. For example, we worked with a company that had more than 9 petabytes of data spread across multiple data warehouses and other storage systems, yet it was using only 0. Cloud-based digital and data platforms provide the foundation on which companies can quickly build scalable analytics solutions that create value. These platforms enable fast access to the large amounts of raw data that companies already have; they allow data scientists to combine that data with data sources, both structured and unstructured, and they do all this at a fraction of the cost of traditional data warehouse solutions. In most cases, a digital and data platform comprises three components: This is a data lake that gathers structured and unstructured raw data directly from sources—such as warehouses, factories, and inbound and outbound trucks—along the value chain, depositing it into a central repository. This set of algorithms can run powerful data analyses, applying AI and other types of analytics techniques. With this process, distilled information and insights are delivered to employees and managers in a user-friendly format, typically through cloud-based responsive mobile software. In addition to the technology, a digital and data platform requires changes in the way IT commonly works. Use cases are deployed incrementally through sprints with far greater flexibility, more interaction with business units and support functions, and continuous iterations. The results can be dramatic. For example, one of our clients was able to develop a new data and digital platform to support its first set of analytics use cases within four months, and at a fraction of the cost of a traditional data warehouse—tens of thousands of dollars, instead of millions. Another client deployed its brand-new data platform within months, simultaneously conducting a multiyear rollout of a new SAP-based enterprise resource planning system. Companies need to start with a clear understanding of the pain points and value gaps in their value chain and then design solutions for specific use cases, such as demand forecasting, inventory management, quality management, and order fulfillment. Such targeted solutions can be deployed in a modular manner, with a clear focus on value creation, and then linked together through a digital integrated control tower that enables end-to-end transparency and integrated planning for all solutions across the entire value chain. Furthermore, rather than trying to design an ideal solution at the outset, companies should start by developing minimum viable products (MVPs)—basic prototypes that they can deploy quickly, begin using, and refine over time. Three Critical Components To achieve sustainable gains, companies must focus not only on technology and algorithms but also on creating the right organizational environment and changing business processes. On the basis of our experience, we have identified three critical components that form a foundation for digital technology. Companies that want to capitalize on new technologies quickly can turn to outside vendors. However, to create a sustainable competitive advantage, they must build up new internal capabilities. Some companies identify massive amounts of value in the initial proof-of-concept stage but fail to capture that value across the organization. They did not have the right capabilities in place. Three core roles are fundamental for success in the digital world: They also oversee the teams working to develop those tools. Data Scientists and Data Engineers. These are the experts who execute analytics projects, gather and prepare the required data, construct analytical models, and maintain the actual algorithms. Scrum Masters and Agile Coaches. With their particular expertise, scrum masters and agile coaches can create the right structure and establish an appropriate pace at the beginning of and throughout a project, helping teams work in a more agile fashion. Some of these roles can be filled through training initiatives for employees and managers already within the company, but success also requires attracting new talent. Establishing the Right Organization Structure. Successful digital deployment requires strong leadership and guidance—especially at the beginning of the journey—and the creation of new digital functions, such as data analytics. For example, most companies with regionally distributed leadership and different types of products, facilities, and processes likely have corresponding variation in business models, objectives, and reporting structures. In many cases, such companies apply a decentralized model in which each business unit has its own analytics function. Conversely, a company with highly standardized processes, centralized leadership, and similar problems across facilities and business units would likely have a single analytics function for developing solutions. To

capitalize on digital, companies must adapt their processes and change the way they make decisions. Furthermore, companies that aim to fundamentally improve performance must undergo the difficult process of changing cultures. Departments can no longer function in silos: Rather than focusing solely on their small slice of responsibility within the value chain, teams must become part of a more comprehensive solution in which data-driven insights lead to changes that improve operational and financial performance. In reality, this means that with new insights, companies can significantly cut steps from their planning processes, streamline decision making, and focus teams on what really matters—especially their customers. Collaboration and transparency are crucial to capturing the full potential of a business through digital. Data governance is crucial for ensuring that data is of the right quality and is available to the relevant business leaders. Data ownership typically sits with business units, so data officers and stewards need to be nominated to guarantee that all data is maintained properly. Key Success Factors Throughout the digitization of industrial value chains, several imperatives apply: Lead from the business rather than the technology. Business leaders have the clearest understanding of the problems they face, so they should be directly involved in designing digital solutions. Obtain top-level buy-in from day one. Senior executives need to lead the way. Plan to generate value quickly. Positive financial results build momentum and counter skepticism. Immerse the organization in the digital world. Emphasize new ways of working and make it crystal clear that there will be no going back to outdated analog processes. Enable agile decision making. Use data to inform changes. In the past, industrial companies could direct their focus to operational excellence. Companies will rise and fall depending on how they handle—and capitalize on—data. Many industrial manufacturers have taken only initial steps toward transforming their value chains through digital. Although that means a longer path ahead, it also means a bigger potential advantage for first movers. Companies that recognize the digital opportunity and take deliberate action to capitalize on it will give themselves a sustainable advantage. Those that fail to capitalize on this opportunity risk falling behind.

6: communication - How should a project manager capture decisions? - Project Management Stack Exchange

The two main issues with capturing that knowledge have been the lack of a consistent format and process to capture it. FICO has been working very closely with the Object Management Group, a standards body, to create a standard for documenting decisions.

Overall process involved for example, deliver the solutions High-level steps involved in the solution People responsible for the process Description of how the process fits with the people As shown in Figure 1 , the matrix makes these seven areas easy to identify. Business unit, customer facing unit, and geographic area impacted are on the left; overall process and high-level steps are across the top; the people involved are on the right; and in the middle is the applicability of a given process to the people, units, and geographic area involved. Applicability matrix View image at full size As you review the matrix, you can easily see that some processes apply to some areas but not others and that the responsibility for execution of a process does not always lie with an area impacted by the process. You can also see the names of the people with the primary responsibility for the area which is defined by the roles you assign. This is a very simple matrix. Some have multiple subprocesses included. Create your matrix according to what makes the most sense for your organizational processes. Specific people are listed in this matrix example to make it easier for readers to determine who to contact. You might prefer to simply list the roles that are impacted instead. Explain the product line or services impacted The next item to include in your guide is the impacted product lines. Because when people think about processes, they often think in terms of what the process impacts. For most businesses, this is a product line. If your business has no products but offers services instead, add the impacted services. If you have both, add both. This particular section may be very short. Its purpose is to give readers a clear understanding of which product lines and services are included in the processes the guide covers. An example might be "This guide includes the following product lines: Include the roles involved in the process If you have a process, then you have people responsible for ensuring the process flows properly and effectively. Each of those people should have a clear role that is explained within your guide. This particular section can be quite illuminating as you work through it. Start with the person responsible for deploying the process at its most base level and work your way up through anyone else who approves all or part of the process from design to approval to implementation. Your sales processes are used in three countries: The people involved in the process range from worldwide leaders who approve the process at the highest levels to country execution teams who actually implement the process. In between are people on executive, steering, or deployment committees and teams who review and approve the finances and deployment decisions. So, your guide reflects each of these process roles with brief explanations to show where and how all of these roles fit together. Perhaps you have a worldwide process design leader who is in charge of developing and managing the business process design, documentation, and communication of all sales processes in all three countries. This person works in conjunction with worldwide business unit leaders who are responsible for the actual implementation of the process in all three countries. In turn, the worldwide business leaders must work with country business unit process leaders who take responsibility for ensuring the process is properly implemented in each country. The roles continue down to the deployment team that handles the actual hardware and software changes required. As you can see, the roles can vary depending upon the piece of the process involved, as well as the location of the process. For instance, a country execution team role might have clear authority to implement the new hardware and software but not the authority to make changes to any piece of the process. In your guide, clearly state that distinction. When the roles are reviewed, it should be easy to determine who holds final approvals for changes or exceptions, who is in charge of deployment, who handles financing, and so on. Remember, process roles are not tied to a particular person at your company. Instead, a person fills a role. This is a key point. At the same time, be sure role responsibilities do not overlap. If you have a country leader and a business unit leader in that country who have the same responsibilities, who has the final say? Defining roles is a task that may take some time to be sure you identify any problems before they occur. Document process management system procedures Process management systems are simply the

reporting methods that show who is reporting to who -- and when -- about the process. You can read more about this concept in " Manage the process, not the steps. For some, this may be a simple paragraph, for others it may mean the inclusion of a chart or graphic to show how the management system works. Including this in your guide helps readers recognize all the people who have a stake in the process. Establish an exception management process The next section of your guide deals with process management system procedures. These vary according to the organization involved but should always include how variations and changes to a process will be handled. For example, your exceptions policy might say "Exceptions to the worldwide process may be requested by using the Exception Change Request form outlined in section 3. Exceptions are typically granted for targeted audiences that require unique implementation guidelines for successful execution of the process. Exceptions require the approval of all affected business unit leaders and the worldwide process design leader. Remember, this guide is supposed to provide quick and easy reference for a wide variety of people. Including graphic representations alongside your text is always appreciated by readers. Include a decision matrix The final piece that should be included in any process documentation guide is a decision matrix. This differs substantially from the applicability matrix mentioned earlier in this article. Applicability matrices allow readers to see the scope and who covers the processes at a glance, while decision matrices show readers exactly who can actually make decisions and the types of decisions that can be made for the process. For a decision matrix to work effectively, you must already have your roles established. Then, from those roles you should be able to determine who has the ability to approve a decision, who must review a proposed decision, who can endorse a proposed or final decision, and who must be consulted with before the decision is finalized. You also need to determine the types of decisions that are involved in the process. You might want to create a single decision matrix that can address any type of decision in any type of process or you may want to create a new one for each process. The types of decisions that might be included in your matrix could be worldwide process design, for instance. Aside from the worldwide process design leader, who else should be involved in decisions about the overall process design? Should an executive approve any proposed changes? Or does the executive simply endorse the changes recommended by the worldwide process design leader while the business unit leaders are required to approve or deny any proposed changes? More details about the decision matrix, including an example, are available in " Manage the process, not the steps. You can certainly add more information to your guide if necessary. Do whatever works for your organization. As long as each guide contains the sections covered in this article, you have a good base for your documentation that you can easily add to as time goes by. The concept of repeatability should be kept at the forefront of your documentation. The sections outlined here are easily repeated in any new guide with minor changes to the text, allowing you to create new guides as needed with minimal time requirements.

7: Capture | Supreme Commander Wiki | FANDOM powered by Wikia

Net income will increase if the special sales price per unit exceeds the unit variable costs A company is within plant capacity. It is contemplating whether a special order should be accepted.

The Definition and Principles of Marketing We will begin with the basics of marketing. In this unit, we will define a number of important terms and distinguish between marketing, advertising, and sales. Advertising and sales are two aspects of marketing, but they come into play much later in the marketing strategy process. Companies focus on sales and advertising only after all other factors of marketing have been determined. This unit will teach you that marketing departments focus on a set of core principles, most of which are summarized by the 4 Ps product, price, place, and promotion. The 4 Ps are also known as the marketing mix. Marketers use the marketing mix to determine the proper strategy for a product. For example, if an inventor comes to you with a new touchscreen technology, how do you sell it? You might first find a product in which the touchscreen would be useful, such as a phone, then determine a target price to maximize sales, identify the best place to sell it e. Applying the 4 Ps in this situation could give you the next iPhone. Completing this unit should take you approximately 10 hours. Segmenting, Targeting, and Positioning Philip Kotler, the grand dean of marketing textbooks, has suggested that if marketers can nail their target and position, all other aspects of a marketing campaign will fall into place. Target and position define whom we are trying to reach with our marketing campaign, and what message or position we will use to connect. The concepts of targeting and positioning are so critical to marketing success that we now dedicate an entire unit to them. Completing this unit should take you approximately 5 hours. Customers and Marketing Research Marketing is all about the customer. But who is the customer? If you are a car manufacturer, you have multiple types of customers. You might have governments and rental agencies that wish to buy fleet vehicles. We call these customers business-to-business B2B. You would also have dealerships to whom you want to sell your cars; this is also B2B. Though the dealer owns the car when it is sold, the manufacturer almost always plays a crucial role in the marketing of that car. Identifying your target customer can be difficult, but with the proper definitions and the right research, marketers will know their customers better than they know themselves. Completing this unit should take you approximately 17 hours. New products typically cost more than existing products due to the high costs associated with production and development- this is best illustrated by technology products. The fact that initial customers will be early adopters of a new product affects the marketing strategy. As the product grows and matures, the strategy again changes; over time, marketers lower the price. When a product is in the declining stage, most competitors leave the market and prices are very low. At each stage, the marketing of the product is different. Marketers must always ask where a new product will fit in their current lineup and how the new product will serve as an extension of an existing brand. Take the car manufacturer BMW. They make sporty luxury vehicles aimed at the upper-middle and wealthy classes. Developing an inexpensive and lower-quality vehicle to compete with cars in another class may dilute the brand and hurt sales. However, if BMW were to market the vehicle under a different brand, they could diversify their product portfolio, avoid the risk of diluting the BMW brand, and be able to reach new customers all at the same time. Some firms go to great lengths to disassociate their brands from one another, while others embrace a family of brands model. Appropriate decisions vary by industry and strategy. Equally important in delivering value to the customer through an offering is how a company sources the goods and services necessary for production and delivers the end product for customers to purchase - otherwise known as the supply chain. Finally in this unit, we will examine issues in pricing, including the costs of delivering a product, customer and societal perspectives, the impacts of competition, and ultimately the revenues a company may generate. Completing this unit should take you approximately 7 hours. Distribution and Promotion Once marketers have identified the right product and determined appropriate pricing, they must decide how to effectively raise awareness and distribute the product. This unit will focus on these decisions. You will learn that distribution is a complex process that involves taking a product through the manufacturing process, shipping to warehouses, distributing to sellers and customers, and taking returned products. Marketers must work with supply chain managers to

determine the best method to route products. If marketers expect that sales will be heavier in the northeast than in the west, additional resources will need to be allocated there to meet demand. There are a number of strategies for moving a product through various distribution channels. These vary based on anticipated demand, actual demand, and the competition. Marketers must have a proactive strategy: They cannot sit on inventory and wait for orders because inventory storage is expensive and a lack of sales is disruptive. The final and arguably most vital aspect of marketing is the actual promotion of the product. This can take the form of giveaways, competitions, advertising, sales, and anything else a creative manager can think of. Marketers must take a number of aspects into consideration, however. If you employ a sales staff to promote the product, how do you compensate them? If you pay a commission, how much commission will be paid per unit? Will the sales staff be given discretion on price, or do you want to send a uniform message that the price is locked in? If a new company has limited funds available for advertising campaigns, might they use public relations tactics to gain free media coverage? These are just a few considerations that marketers must consider. This final unit will provide you with the tools you need to make the best possible promotion decisions. Completing this unit should take you approximately 11 hours. Launching a Marketing Campaign Marketing is not just a matter of internal strategies and customer analysis. There are factors outside of the company that must be taken into consideration with any marketing strategy. Though marketers can control how they might respond to customer needs and expectations, they face the often-unpredictable reactions of customers to them. Maintaining customer satisfaction is essential to sustainable success. Marketers need to be sensitive to the regulatory and ethical constraints that may be placed upon them by a wide range of domestic and international industry standards and the expectations of society. Companies must also face social forces that challenge their success. For example, marketers must be aware of the social and cultural aspects of each region in which they choose to market a product. Even a worldwide brand such as Coca Cola must adjust its marketing strategy for every region it enters. An awareness of the cultural factors affecting a marketing strategy can make the marketing message much more effective. Quite often marketers will address social issues especially relevant to lives of their audiences or the larger society with social marketing campaigns. Completing this unit should take you approximately 32 hours. Study Guides and Review Exercises These study guides are intended to help reinforce key concepts in each unit in preparation for the final exam. Each unit study guide aligns with course outcomes and provides a summary of the core competencies and a list of vocabulary terms. The study guides are not meant to replace the readings and videos that make up the course. The vocabulary lists include some terms that might help you answer some of the review items, and some terms you should be familiar with to be successful in completing the final exam for the course.

8: Decision Fundamentals: Capturing Subject Matter Expertise

during coding, \$20 during unit testing, and as much as \$ after delivery of the system! So it pays to take time to understand the problem and its context, and to get the requirements right the first time.

This station burns straw as fuel. The adjacent greenhouses are heated by district heating from the plant. Many process industries, such as chemical plants, oil refineries and pulp and paper mills, require large amounts of process heat for such operations as chemical reactors, distillation columns, steam driers and other uses. This heat, which is usually used in the form of steam, can be generated at the typically low pressures used in heating, or can be generated at much higher pressure and passed through a turbine first to generate electricity. In the turbine the steam pressure and temperature is lowered as the internal energy of the steam is converted to work. The lower pressure steam leaving the turbine can then be used for process heat. Steam turbines at thermal power stations are normally designed to be fed high pressure steam, which exits the turbine at a condenser operating a few degrees above ambient temperature and at a few millimeters of mercury absolute pressure. This is called a condensing turbine. For all practical purposes this steam has negligible useful energy before it is condensed. Steam turbines for cogeneration are designed either for extraction of some steam at lower pressures after it has passed through a number of turbine stages, with the un-extracted steam going on through the turbine to a condenser. In this case, the extracted steam causes a mechanical power loss in the downstream stages of the turbine. Or they are designed, with or without extraction, for final exhaust at back pressure non-condensing. Steam at ordinary process heating conditions still has a considerable amount of enthalpy that could be used for power generation, so cogeneration has an opportunity cost. A typical power generation turbine in a paper mill may have extraction pressures of psig 1. A typical back pressure may be 60 psig 0. In practice these pressures are custom designed for each facility. Conversely, simply generating process steam for industrial purposes instead of high enough pressure to generate power at the top end also has an opportunity cost See: Steam supply and exhaust conditions. The capital and operating cost of high pressure boilers, turbines and generators are substantial. This equipment is normally operated continuously , which usually limits self-generated power to large-scale operations. A cogeneration plant in Metz , France. The 45MW boiler uses waste wood biomass as energy source, and provides electricity and heat for 30, dwellings. For example, the RU MHD generator in Moscow heated a boiler for a conventional steam powerplant, whose condensate was then used for space heat. A more modern system might use a gas turbine powered by natural gas , whose exhaust powers a steam plant, whose condensate provides heat. The viability of CHP sometimes termed utilisation factor , especially in smaller CHP installations, depends on a good baseload of operation, both in terms of an on-site or near site electrical demand and heat demand. In practice, an exact match between the heat and electricity needs rarely exists. A CHP plant can either meet the need for heat heat driven operation or be run as a power plant with some use of its waste heat, the latter being less advantageous in terms of its utilisation factor and thus its overall efficiency. The viability can be greatly increased where opportunities for trigeneration exist. In such cases, the heat from the CHP plant is also used as a primary energy source to deliver cooling by means of an absorption chiller. CHP is most efficient when heat can be used on-site or very close to it. Overall efficiency is reduced when the heat must be transported over longer distances. This requires heavily insulated pipes, which are expensive and inefficient; whereas electricity can be transmitted along a comparatively simple wire, and over much longer distances for the same energy loss. A car engine becomes a CHP plant in winter when the reject heat is useful for warming the interior of the vehicle. The example illustrates the point that deployment of CHP depends on heat uses in the vicinity of the heat engine. Thermally enhanced oil recovery TEOR plants often produce a substantial amount of excess electricity. After generating electricity, these plants pump leftover steam into heavy oil wells so that the oil will flow more easily, increasing production. TEOR cogeneration plants in Kern County, California produce so much electricity that it cannot all be used locally and is transmitted to Los Angeles [citation needed]. CHP is one of the most cost-efficient methods of reducing carbon emissions from heating systems in cold climates [6] and is recognized to be the most energy efficient method of transforming energy from fossil fuels or

biomass into electric power. Types of plants[edit] Topping cycle plants primarily produce electricity from a steam turbine. Partly expanded steam is then condensed in a heating condenser at a temperature level that is suitable e. Bottoming cycle plants produce high temperature heat for industrial processes, then a waste heat recovery boiler feeds an electrical plant. Bottoming cycle plants are only used in industrial processes that require very high temperatures such as furnaces for glass and metal manufacturing, so they are less common. Large cogeneration systems provide heating water and power for an industrial site or an entire town. Common CHP plant types are: Gas turbine CHP plants using the waste heat in the flue gas of gas turbines. The fuel used is typically natural gas. Gas engine CHP plants use a reciprocating gas engine which is generally more competitive than a gas turbine up to about 5 MW. The gaseous fuel used is normally natural gas. Typical outputs and efficiencies see [8] Typical large example see [9] Biofuel engine CHP plants use an adapted reciprocating gas engine or diesel engine , depending upon which biofuel is being used, and are otherwise very similar in design to a Gas engine CHP plant. The advantage of using a biofuel is one of reduced hydrocarbon fuel consumption and thus reduced carbon emissions. Another variant is the wood gasifier CHP plant whereby a wood pellet or wood chip biofuel is gasified in a zero oxygen high temperature environment; the resulting gas is then used to power the gas engine. Typical smaller size biogas plant see [10] Combined cycle power plants adapted for CHP Molten-carbonate fuel cells and solid oxide fuel cells have a hot exhaust, very suitable for heating. Steam turbine CHP plants that use the heating system as the steam condenser for the steam turbine. Nuclear power plants , similar to other steam turbine power plants, can be fitted with extractions in the turbines to bleed partially expanded steam to a heating system. The heat is removed from the exhaust and radiator. The systems are popular in small sizes because small gas and diesel engines are less expensive than small gas- or oil-fired steam-electric plants. Some cogeneration plants are fired by biomass , [13] or industrial and municipal solid waste see incineration. Some CHP plants utilize waste gas as the fuel for electricity and heat generation. Waste gases can be gas from animal waste , landfill gas , gas from coal mines , sewage gas , and combustible industrial waste gas. The installation is usually less than 5 kWe in a house or small business. Instead of burning fuel to merely heat space or water, some of the energy is converted to electricity in addition to heat. This electricity can be used within the home or business or, if permitted by the grid management, sold back into the electric power grid. With a Lifetime of around 60, hours. For PEM fuel cell units, which shut down at night, this equates to an estimated lifetime of between ten and fifteen years. One author indicated in that MicroCHP based on Stirling engines is the most cost effective of the so-called microgeneration technologies in abating carbon emissions; [21] A UK report from Ecuity Consulting stated that MCHP is the most cost-effective method of utilising gas to generate energy at the domestic level. Cogeneration systems linked to absorption chillers use waste heat for refrigeration. The peak delivery is 10 million pounds per hour or approximately 2. This is more valuable and flexible than low-grade waste heat, but there is a slight loss of power generation. The increased focus on sustainability has made industrial CHP more attractive, as it substantially reduces carbon footprint compared to generating steam or burning fuel on-site and importing electric power from the grid. Utility pressures versus self generated industrial[edit] Industrial cogeneration plants normally operate at much lower boiler pressures than utilities. Among the reasons are: Boiler feed water must be completely oxygen free and de-mineralized, and the higher the pressure the more critical the level of purity of the feed water. Heat recovery steam generators[edit] A heat recovery steam generator HRSG is a steam boiler that uses hot exhaust gases from the gas turbines or reciprocating engines in a CHP plant to heat up water and generate steam. The steam, in turn, drives a steam turbine or is used in industrial processes that require heat. The HRSG is designed based upon the specific features of the gas turbine or reciprocating engine that it will be coupled to. Since the exhaust gas temperature is relatively low, heat transmission is accomplished mainly through convection. The exhaust gas velocity is limited by the need to keep head losses down. Thus, the transmission coefficient is low, which calls for a large heating surface area. Since the temperature difference between the hot gases and the fluid to be heated steam or water is low, and with the heat transmission coefficient being low as well, the evaporator and economizer are designed with plate fin heat exchangers. Comparison with a heat pump[edit] A heat pump may be compared with a CHP unit as follows. If, to supply thermal energy, the exhaust steam from the turbo-generator must be taken at a higher temperature

than the system would produce most electricity at, the lost electrical generation is as if a heat pump were used to provide the same heat by taking electrical power from the generator running at lower output temperature and higher efficiency. Because the losses are proportional to the square of the current, during peak periods losses are much higher than this and it is likely that widespread. It is also possible to run a heat driven operation combined with a heat pump, where the excess electricity as heat demand is the defining factor on utilization is used to drive a heat pump. As heat demand increases, more electricity is generated to drive the heat pump, with the waste heat also heating the heating fluid. Distributed generation[edit] Most industrial countries generate the majority of their electrical power needs in large centralized facilities with capacity for large electrical power output. These plants benefit from economy of scale, but may need to transmit electricity across long distances causing transmission losses. Cogeneration or trigeneration production is subject to limitations in the local demand, and thus may sometimes need to reduce e. An example of cogeneration with trigeneration applications in a major city is the New York City steam system. Thermal efficiency[edit] Every heat engine is subject to the theoretical efficiency limits of the Carnot cycle or subset Rankine cycle in the case of steam turbine power plants or Brayton cycle in gas turbine with steam turbine plants. Most of the efficiency loss with steam power generation is associated with the latent heat of vaporization of steam that is not recovered when a turbine exhausts its low temperature and pressure steam to a condenser. In cogeneration this steam exits the turbine at a higher temperature where it may be used for process heat, building heat or cooling with an absorption chiller. The majority of this heat is from the latent heat of vaporization when the steam condenses. Thermal efficiency in a cogeneration system is defined as:

9: Cogeneration - Wikipedia

The Supreme Court Building is open to the public from 9 a.m. to p.m. The Justices will meet in a private conference to discuss cases and vote on petitions for review. The Court will release an order list at a.m. on Tuesday, November

Page 32 Share Cite Suggested Citation: The National Academies Press. The difficulty of operating autonomously at a significant distance from battalion headquarters was a consistent theme in all 23 of the interviews that the committee conducted with small unit leaders. In Iraq and Afghanistan, a single infantry battalion of approximately 1, Marines can be responsible for more than 17, square miles of territory. Operating at significant distances from the infantry battalion, Marine small unit leaders, including company commanders, platoon commanders, and squad leaders, often find themselves planning and executing missions under the same conditions and facing the same decisions that infantry battalions and their leaders might encounter. However, small units are unlikely to have the full complement of equipment and expertise typically available to a battalion. Geographical dispersion clearly affects unit performance. The small unit leaders interviewed by the committee consistently pointed to significant and frustrating gaps in technology and equipment, including communications and vehicles, as well as logistical support. A Marine lieutenant who led a rifle platoon in Iraq reported that the biggest problem for his unit was ensuring adequate and timely supplies to the rifle squads occupying 12 positions in a remote area. Page 33 Share Cite Suggested Citation: Pursuit of counterinsurgency strategies in hybrid environments means that small units conduct a range of missions, from kinetic engagements to rural development projects. At the battalion level, such efforts would be supported by a complement of personnel with training in intelligence collection and analysis, logistics, civil affairs, and other operational functions. However, these personnel may not be available at the small unit level, which creates problems when those units are operating at a significant distance from the infantry battalion headquarters. Several of the small unit leaders interviewed by the committee said that they had addressed some of these resource challenges by changing their organizational structure and their tactics, techniques, and procedures TTPs 8 in order to make adjustments for conditions on the ground. Accessed June 8, Page 34 Share Cite Suggested Citation: For example, the ability to communicate reliably and clearly with fellow Marines and with more senior command echelons is extremely important, particularly when small units are operating for long periods of time at significant distances from the forward operating base. The Marine Corps is aware of the need to provide a fuller complement of both materiel and personnel resources to companies, platoons, and squads operating in a distributed mode. Page 35 Share Cite Suggested Citation: Such training may help small units cope with the resource challenges that they face with distributed operations. For example, one Marine captain deployed in a very remote and mountainous area told the committee that the vehicles provided in-theater were old and prone to breaking down. He felt fortunate to have taken a driving course that gave him skills in preventative vehicle maintenance and repair. Effective stabilization and reconstruction efforts are critical in counterinsurgency warfare, which posits that functioning civil institutions and economic opportunity serve as a powerful inoculation against social instability and violence. The small unit leaders interviewed by the committee described a diversity of missions, including securing a village decimated by Taliban fighters to enable people to rebuild their homes, interdicting border incursions, professionalizing national military forces, building an urban police force, collecting intelligence, coordinating medical care for local female populations, sweeping for IEDs, and locating and interdicting insurgents. This list is not exhaustive, but it does illustrate the range of responsibilities that small unit leaders face when deployed. To complicate matters, Marines who are engaged in stabilization-and-reconstruction-type missions are also likely to encounter situations in which the use of force becomes necessary. In a volatile operational environment, apparently calm situations can degrade into full combat with little warning. In such situations, an optimal course of action may not be immediately apparent, given that immediate actions can have longer-term second- and third-order effects. Accessed December 3, The status of the concept of CLOCs is uncertain. Page 36 Share Cite Suggested Citation: He chose to provide emergency medical care for the elder and, in doing so, won the trust of the village but failed to interdict the insurgents. Over the long run, he felt that this was the best outcome, since

village residents began to provide the Marines with information on IED emplacements. He described having to effect dramatic changes in perspective and attitude for himself and his Marines several times a week, and often on a daily basis. Interdicting adversaries—for example, insurgents who are building and deploying IEDs—is critical for the safety and survival of the Marines. However, identifying adversaries may require actions that are detrimental to trust relationships, such as conducting surprise house searches or arresting village residents. Operations such as these require finesse and nuanced judgment, because Marines may interact with local populations in ways that can easily be perceived as invasive or offensive. These can include entering homes to search for weapons, briefly assuming control of living spaces while conducting patrols to observe street activities without being seen, and even living in homes for short periods of time. Local populations can easily be alienated by overwhelming displays of force. One small unit leader attributed his success in confiscating a prohibited weapon to his positive relationship with a village elder: He contrasted this experience with another small unit leader who decided to bring in tanks to threaten a village into surrendering its prohibited weapons. The village emptied, the weapons were never confiscated, and any trust between U. Marine small units and their leaders often interact with and coordinate 18 USMC interviews with committee subgroup members, Quantico, Va. Accessed August 26, Page 37 Share Cite Suggested Citation: Cross-cultural, cross-institutional relationship building in a war zone is no easy task, and success may depend on a mixture of personal disposition toward this kind of work as well as training and experiential learning. Ideally, such operations would be assigned to experienced and mature military personnel. However, the average age of the Marine Corps in was 22, and 67 percent of deployed Marines were in their first term of enlistment. As one captain told committee interviewers, companies and noncommissioned officers NCOs can have strategically significant results depending on their effectiveness in identifying enemies and establishing productive relationships with local populations. The Marine Corps currently has no formal policy for directing Marine commands, from the battalion on down, on how to select small unit leaders at the company, platoon, or squad levels. For example, one captain who participated in the Quantico interviews enthusiastically described his experience leading an embedded training team in Afghanistan. At one point, he became argumentative with the leader of the kandak, and the two exchanged religious and cultural slurs. This incident quickly scaled the chain of command in both the Afghan and American forces. In recounting this story, the interviewee told committee members that he wished that his superior officers had paid more attention to how small unit 23 Dennis Judge, Ground Training Division, U. Page 38 Share Cite Suggested Citation: For example, skilled interpreters are critically important in any mission that requires effective communication and partnership with local communities. However, one small unit leader pointed out that effectively working with a native language interpreter is not a straightforward process. He thought that it required training and wished he had been provided more thorough preparation in the mechanics of communicating with local populations through an interpreter. The SAT paradigm calls for ongoing analysis, design, development, implementation, and evaluation of training programs. In this model, training and readiness standards are updated on approximately a 2-year cycle to incorporate information from operational after-action reviews and lessons learned. To ensure that training curricula and structures are preparing Marine small units for the diverse demands of hybrid warfare, TECOM is working to identify and define the competencies needed by both enlisted Marines and officers at all grades. In addition to the traditional warfighting skills, emerging training approaches are focused on developing cognitive, psychomotor, and affective skills in small unit leaders, with an emphasis on cultivating intuitive decision making in 26 USMC interviews with committee subgroup members, Quantico, Va. Page 39 Share Cite Suggested Citation: Navy have subscribed for more than two decades. TECOM has recently identified intuitive decision making as an important set of skills for small unit leaders in particular. Implementing novel approaches to training is challenging for a number of reasons, however. First, and perhaps most importantly, Marine units must already undergo a great deal of training, and time for additional training is already limited. Secondly, the Marine Corps lacks a coordinating responsible organization to unify efforts around training oriented toward decision making. It is also providing Marines with predeployment education and training in both language and cultural interactions. For example, despite having received some training in local languages, several small unit leaders told the committee that they would have preferred working with a skilled

interpreter to support interactions with local populations. Page 40 Share Cite Suggested Citation: However, Marines in Iraq and Afghanistan are also fighting an intelligent, determined, and adaptive insurgency for which traditional force-on-force TTPs are poorly suited. Because insurgents are members of local populations, it can be difficult for Marines to distinguish adversaries from neutral members of a population, and insurgent activities may not be easily discriminable from the normal patterns of life in a region. Page 41 Share Cite Suggested Citation: One Marine captain described how an insurgent could almost invisibly plant an IED in a public square in an urban area of Iraq by walking through a crowded intersection during a busy time of day, dragging the device into place using a thin cord attached to his or her body; when the device was in place, the insurgent would surreptitiously cut the cord and walk away. Not only was it difficult to see the cord from the observation post, but the Marines could not easily distinguish the individual performing the placement from the scores of other people walking through the streets. The small unit leaders interviewed by the committee at Quantico mentioned numerous examples of this kind of adaptation. For example, one Marine squad leader told the committee how Taliban fighters in a remote area of Afghanistan observed his Marine patrol using a metal detector to search for IEDs located along footpaths. Within a few days, the Taliban fighters had changed tactics, burying pressure plates under pieces of wood to defeat the metal detector. As a consequence, this sergeant lost one of his squad members during a routine patrol when the metal detector did not signal the presence of a pressure plate. Klein, Brian Moon, and Robert R. Page 42 Share Cite Suggested Citation: The quality, timeliness, and accuracy of information that can support the development and evaluation of frames of reference is critical if Marines are to identify and respond to novel threat patterns. Over the past decade, the Marine Corps has employed established protocols and procedures to collect, process, and disseminate information about emerging trends and events on the battlefields of Iraq and Afghanistan. For example, one protocol outlines procedures for transferring authority to incoming units and conducting intelligence operations. Such information can help Marines develop the frames of reference required to effectively assess and respond to events in their area of responsibility AOR. For example, Marine small unit leaders pointed out that the basic procedures governing the transfer of authority were a critical starting point for developing situational awareness during the early days of a deployment. When Marine units rotate into a new area, the unit that is leaving typically provides extensive information and lessons learned to the small unit leaders and personnel who will be taking over responsibility. However, as several Marine small unit leaders explained, members of insurgency groups are not unaware of this transfer and can leverage it to their tactical advantage. Page 43 Share Cite Suggested Citation: IEDs were a near-daily threat, and he recognized that his unit was having difficulty getting accustomed to dealing with the prevalence of IEDs and the rapid changes in adversarial tactics for placing them. Timely and relevant information about local trends and events is critically important for the efficacy of small units. For example, when asked to assess the quality of intelligence provided by coalition forces in Iraq, one small unit leader told the committee: Anything worth a damn came from the locals. Realizing that intelligence from his command was unlikely to help him keep track of trends in IED emplacements, he learned to rely on the explosive ordnance device clearing teams for information about evolving adversary tactics. We decided that we should just go and get the intelligence we needed ourselves. Page 44 Share Cite Suggested Citation:

24th Euromicro 98 Conference Report of the Committee of Claims, on the petition of Henry Hill. Melbourne House. By the author of Wide, wide world. Measuring and comparing the (in efficiency of German and Swiss hospitals The technique of orchestration 6th edition A letter to the most Reverend the Lord Archbishop of Canterbury, on the present opposition to any further Short history of Yugoslavia from early times to 1966 18. Treatment: an update and recommendations for research and practice Wendy K. Silverman and Luci Motoca The language of slavery Security cooperation Avocent switchview 1000 manual The first railway Anxiety, phobia, depression, and bipolar disorder Stephen Larsen . [et al.] No one died and made us King! The Lotus guide to Freelance graphics for Windows, release 2.0 Peter and Polly in summer Falling in Love Is Facing Saddams Iraq: Disarray in the international community Epilogue : falling down, reaching for the stars, and coping with feelings Handbook of the American Frontier, Volume IV The trace as the force of the absent Talent management in school filetype Pay attention, Slosh! Scroll Saw Toys and Vehicles Lingua franca English as chimera: sociocultural and sociolinguistic perspectives Allan James Rogue moon Algis Budrys The Clinical Research Survival Guide Psychological adjustment and rehabilitation Textbook of elements of mechanical engineering by murthy American Phrasebook for Russians (Hippocrene Language Studies) Whats wrong with the psychological therapies? Closing arguments Chrysostom on marriage and family life History of royal dutch shell Critical Theory, Politics And Society Google web designer tutorial espaÃ±ol The power of no Power and Gender in Renaissance Spain Favorite Recital Repertoire Biskind, E. L. Legitimacy of children born by artificial insemination.