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Leaders and organizations [should] use this period as an opportunity to build for a stronger future and prepare to better support citizens whose needs will undoubtedly increase.

How the public sector is transforming itself

by Mikael Hagström, Executive Vice President of SAS Europe, Middle East, Africa and Asia Pacific

We are living in a time of uncertainty, where government leaders are doing their best to predict future needs and trends. In our experience, we see that different government agencies, departments and ministries are responding to the volatility and ever-changing economic climate in a few different ways. First, there are those with knee-jerk reactions, who respond by halting programs or instituting cutbacks to alleviate anxiety, even if those actions negatively affect service levels for citizens.

Then there are those who take a wait-and-see approach and operate as though it is business as usual, waiting for a return to normal. What they are not acknowledging is that the current times are the new normal, and the old times will not come back. Today is the beginning of a new standard.

A third category is one where leaders and organizations use this period as an opportunity to build for a stronger future and prepare to better support citizens whose needs will undoubtedly increase.

While many articles about innovation focus on expensive research and inventions, we have decided to focus on convergence across industries and the deployment of what is already invented

in new ways and across industries. This issue of *Intelligence Quarterly* may not cover your specific industry or problem, but it is my hope that it will give you ideas to deploy in your area.

In this issue, we have highlighted what the public sector is doing to adapt, govern and better meet the needs of citizens in the new standard by:

- Increasing tax revenue through better collection, while simultaneously maintaining or even lowering current tax rates.
- Creating stability and safety in uncertain times, when unpredicted events have an even greater impact on the lives of citizens.
- Investigating how to fight the trend that occurs during hard times when the poor are getting poorer.
- Using solutions originally designed to fight fraud in efforts to battle drug abuse (one of many examples that show how we help people live healthier and better lives).

Innovation is not always about invention, but about converging technologies among industries for new and innovative uses.

Also in this issue is an insightful article by SAS co-founder and CEO Jim Goodnight and education consultant Mark Milliron on transforming education to meet the needs of today's employers. Goodnight has the unique experience of being:

- A consumer of education: He earned his PhD in statistics.
- A provider of education: He was a professor at North Carolina State University before co-founding SAS.
- A developer of a new model for education: He is co-founder of the technology-driven Cary Academy and the driving force behind a comprehensive, online curriculum that is already replacing outmoded 20th century instructional resources all across the United States.

He has been a sought-after speaker by governments and organizations around the world on education reform – as well as on developing, motivating and retaining knowledge workers.

One last note about this issue of *Intelligence Quarterly*. The picture of the starfish on the previous page makes me think about how we process information as humans. The oldest and most effective organizational entity is our own

immune system. When attacked by a virus, the immune system acts independently of the centralized brain. It empowers the cell that discovers the intrusion to lead the fight while providing the resources requested. No time is wasted, and action is immediate.

Many organizations lack the ability to test ideas right away and to rapidly design and deploy provocative experiments. The more innovative companies that we are working with are shifting away from traditional research-and-development methods as they discover that experiments don't have to be time-consuming or expensive, and that the feedback can be instant. The focus of leadership teams changes from reviewing a half-dozen big, "innovative" proposals from consulting gurus toward

deciding which innovative experiment to act upon, based on the outcome of timely, real-world experiments. Recent election campaigns, such as that of President Barack Obama in the United States or Prime Minister Lee Hsien Loong in Singapore, have clearly demonstrated what is possible when behavioral information is acted on instantly and ideas can be deployed and evaluated close to real time. Change has never been as easy or inexpensive as it is today.



As the Executive Vice President of SAS Europe, Middle East, Africa and Asia Pacific, Mikael Hagström is passionate about providing a culture where innovation can flourish, resulting in market leadership both for the organization and its customers. He is responsible for optimizing business performance, delivering revenue and managing operations in more than 50 countries with individual P&L (profit and loss) centers and nearly 4,000 employees.

Mission accomplished!

The Philippines Bureau of Internal Revenue reduces federal deficit, improves tax collection processes with SAS®, realizing 400 percent ROI

The mission of the Bureau of Internal Revenue (BIR) of the Republic of the Philippines is to raise revenue for the government through the efficient collection of taxes, provide quality service to taxpayers and to ensure impartial and uniform enforcement of tax laws. In its role as the tax collection agency of the Philippines, the BIR is the pillar of the economy. As recently as 1998, however, tax collection was in a freefall, resulting in lower governmental revenues and higher budget deficits. To successfully fulfill its mission and to effectively turn around the tax revenue collection process, the BIR turned to SAS.

Back from the brink

“Over the past few years we became less and less successful in collecting taxes, as evidenced by the continuous decline of our Tax Effort Ratio (TER), which is total revenue collections over Gross Domestic Product (GDP),” says Estelita Aguirre, Deputy Commissioner and Head of Large Taxpayer Operations Group. “This occurred for several reasons, such as the complexity of BIR requirements, the increasing volume of business transactions and the absence of an online system to handle the tracking and monitoring of the taxable transactions. And, of course, this affected the Philippine government because the shortfall had an impact on the budget deficit.

“Using SAS has been our vindication, and our deliverance from the brink,”

continues Aguirre. “For so long we had been accused of being ineffective in implementing the value-added tax (VAT) system. The situation got so dire that a congressman actually submitted a bill to completely abolish the VAT! And we could only nervously counter that we were trying our best to enforce collections. But after we started the ‘Reconciliation of Listings for Enforcement’ (RELIEF) project using SAS, the VAT audit trail became very easy to track and the trend was finally reversed. In fact, during the initial implementation of the RELIEF project we experienced an amazing turnaround.”

“In just the first year, we uncovered approximately PHP 70 billion in under-declarations, and the PHP 6 billion (US\$114 million) that we collected in that year amounted to a 400 percent return on investment! Just on the initial implementation! It was so easy to convince our commissioner of the advantage of using SAS software because the benefits can be quantified quite clearly.”

Lilia Guillermo, BIR’s CIO and Deputy Commissioner of the Information Systems Group, says that the return on investment from SAS continues to be huge. “We have now generated about seven billion pesos from the process: 200 million pesos uncovered from Bureau of Customs data, 3.2 billion pesos collections from under-declarations that we identified, and 3.6 billion of additional voluntary declarations after the message got out that we would

identify under-declarations in the long run,” says Guillermo. “Taxpayers now understand that we run an effective system, and that means we have to spend less time contracting them directly.”

Supporting Auditing and Enforcement

The BIR began using SAS solutions to support their Tax Administration Program initially in the areas of Auditing and Enforcement. Implementing SAS/Warehouse Administrator and the SAS Information Delivery Portal, the BIR has successfully centralized their tax information and consolidated and analyzed crucial data, including: income tax and VAT returns data, sales and purchase declarations covered by VAT and information from third-party sources such as the Philippine Bureau of Customs (BOC).

One of the initial projects that the BIR undertook with SAS was to concentrate on the correct declaration of VAT by large corporate taxpayers. “One of our important tasks at the BIR is to collect the correct amount of VAT and income tax,” says Aguirre. “VAT is an indirect business tax imposed on the seller in the course of trade or business on every sale or lease of real or personal properties, or in the course of rendering services, which can be passed on to the buyer.

“Since the inception of the VAT system in the Philippines in 1988, the BIR has time and again been charged with

being ineffective in implementing the system because it simply had too many weak spots,” continues Aguirre. “One of the crucial weak spots is that, while the VAT system itself has a built-in control mechanism through its audit trail and the output-input features of VAT invoices and receipts, the actual matching of sales and purchases, as well as output tax versus input tax, was being done manually on a very limited scale at the National Office and District Office levels. Taxpayers were therefore taking advantage of these limitations by hiding their purchase information and shrinking their sales declarations.”

How, then, did the BIR solve these problem areas? Aguirre states that, “the computerized matching system, now known as the RELIEF system, was conceptualized under the Third Party Information (TPI) Program to provide a comprehensive, nationwide control and monitoring mechanism at the National Office whereby transactions between VAT taxpayers that are required to be submitted quarterly in the Summary Lists of Sales and Purchases are processed and matched against the declarations and payments in the VAT returns.

“The Summary Lists of Sales and Purchases are submitted by VAT taxpayers as soft copies (diskettes). Such data is then uploaded into the RELIEF server,” says Aguirre, describing the mechanics of the RELIEF system. “On the other hand, our Integrated Tax System data-

Revenue Watch Dashboard



The revenue watch dashboard reports on tax collections, allowing users to select data by month and year back to 2006. The individual dials compare cumulative revenues with targets and compare current revenues with previous months and years.

bases provide data from the taxpayers’ VAT returns. Data from the two computerized sources are then matched. During the initial stage, we used a pool of people called ‘matchers’ to do this. In 2002, when we decided to institutionalize this project, we sought to accomplish this work in a less human resource-intensive way. Therefore, I consulted with Deputy Commissioner Guillermo about using SAS to analytically match all VAT purchasers’ declarations against those of the seller’s to catch inconsistencies. Now we are eliminating the need for human intervention, and by 2004 we will move from diskette submissions to e-submissions.”

The Power of Information

“After discussing the parameters of the project with Deputy Commissioner Aguirre, I knew that a data warehouse was needed, and I wanted SAS,” says Guillermo. “We also looked at offerings

from other software providers, but SAS cost much less. Also, we had already been using SAS for MIS, and I felt that we should start with the license we already had. Our manager thought that SAS was only a statistical software vendor, but I insisted that the future is in SAS. Previously it had taken us six-eight years to establish a clean taxpayer database, but SAS/Warehouse Administrator quickly provided us with powerful information. I knew I was not mistaken about SAS, and it was so fast to implement.

“For many years, some taxpayers would deliberately try to confuse us and they were very determined not to provide us with required information,” continues Guillermo. “But now we have links with the Bureau of Customs (BOC), and their database interfaces with ours to check whether the taxpayer information reports are consistent. In fact, SAS’ Analytics allows us to match all VAT tax declara-



“Taxpayers now understand that we run an effective system, and that means we have to spend less time contacting them directly.”

Lilia Guillermo,
BIR's CIO and Deputy Commissioner

tions against tax importations from the BOC database to generate discrepancy analysis reports. We exchange information with other governmental agencies as well, and all of this data is stored in our SAS data warehouse.”

“That’s right,” confirms Aguirre. “Now we are able to catch non-complying or falsely complying taxpayers by using SAS! The ‘exception reports’ that we generate collect invalid taxpayer identification numbers, which is our key to identifying them, and we can also uncover fictitious sellers who are not registered in the database. The information and analysis provided by SAS are allowing us to bolster the enforcement and audit procedures that help to increase tax collections.”

The “No Contact Audit” – Reducing Graft and Corruption

“A further advantage of this system is that, since we have phased out human intervention, we now employ what we call the ‘no contact audit’, where we assess and collect taxes without using valuable human resources,” says Aguirre. “The ‘no contact audit’ minimizes the contact that our field tax collectors have with the taxpayers, which saves us money and time as fewer people have to go make site visits. Graft and corruption have also been reduced in this process, because SAS helps us to overcome human failings.”

SAS provides the BIR with a transparent process that supports and strengthens the “no contact audit”. The result is dynamic analytics on taxpayer discrepancies which can be presented to the taxpayer via a letter/report printout, an email attachment or via the Web. The automated generation and monitoring of these “letter notices” is being implemented nationwide using the SAS Information Delivery Portal. The BIR revenue district offices can log on to the Portal and extract notices intended for their respective taxpayers within their jurisdictions.

Taxpayer Compliance Report Card

“The taxpayers should be aware that we now have accurate information about them,” says Guillermo. “In fact, using SAS we came up with an e-report card concept – we call it the ‘taxpayer compliance report card’ – where we are able to clearly demonstrate their compliance details. This e-report card system is intended to benchmark a taxpayer’s performance in comparison to their peers, covering different tax types – income tax, VAT, percentage tax and others, plus historical payment information. We can tell them, ‘you should be paying X amount, but you have actually only paid Y amount’, and we can show that they are number 1 or number 2 or whatever as compared to others in their same industry. The e-report card is addressed and sent to the CEOs, not the accountants, because when the CEOs see this information, they will question the accountants and demand answers. If you are a CEO who wants prestige for your company, you will pay attention! And it is really working.”

“I use the e-report card to show the large corporate taxpayers that we know what we are talking about,” says Aguirre. “In my job, I always talk to the VP for Finance or the Controller, so when I show them this e-report card, it both convinces and challenges them. We can generate reports that list all the taxpayers in one industry and we are able to compare taxpayers without showing their names, keeping their privacy intact. We have statistics on ratios of income tax paid and ‘effective VAT ratios’ (EVRs), so it is easy to convince taxpayers of the preciseness of the data and ratio analysis. Taxpayers are definitely more respectful of us now because they know our information on them is correct. **Quite simply, SAS has revolutionized our tax system.”**

Spreading the News

“Last year I made a presentation before congress which really got their attention,” says Aguirre. “It was in front of the Ways and Means Committee, and I started by saying: ‘Honorable congressmen, I am going to skip the first few slides of my presentation, because I am going to focus directly on a system that we have conceptualized and institutionalized that may yet be the salvation of the BIR and of this country.’ Everybody stopped talking and stared at me. And then I gave the presentation about using SAS software.

“For the first time in my life I got applauded in congress. Then the Chairman of the Ways and Means asked: ‘Why only now? Why hasn’t this been undertaken before?’ And I explained that it first took years to clean up and update the taxpayer database in our Integrated Tax System, which was essential for matching the data, and only then were we able to implement the powerful e-solutions available to eliminate the need for human intervention in the matching process. And I didn’t stop there – I presented this information to the concerned government agencies, to many focus groups and everyone who needed to know about it. I even had the rare chance to explain the RELIEF system to the president of the Philippines!

“I feel that our success with SAS could also open the eyes of other governmental tax administrators. For instance, I made a presentation at the annual meeting of the Study Group on Asian Tax Administration and Research in Thailand about our use of SAS, and the Indonesians and Malaysians wanted to come and see it. I become so passionate when I discuss the SAS solutions, I feel so strongly about them.”

Looking Forward

“The challenge now is to roll out the system to all taxpayers, as we have just focused on large corporate taxpayers up to now,” says Guillermo. “The next step is to focus on small-scale companies and individual taxpayers. Sixty percent of tax collection is from large taxpayers, and we will do the next 40 percent of taxpayers in phases.” The BIR is also looking at expanding their SAS data warehouse and its analytic matching capabilities to cover other third-party information, and they are considering whether to try to collect taxes retroactively from previous years as well.

“I chose the right software vendor, and I am very happy,” continues Guillermo. “The technical infrastructure of SAS is scalable and flexible, and this enabled us to seamlessly grow the data warehouse and to strengthen the tax administration through more transparent processes and increased tax collection and reporting. I see more and more the power of SAS, and I now have a list of several other SAS solutions that I want to license.”

“I am not a technical person, I am simply a software user who knows what she wants based on the organization’s needs,” concludes Aguirre. “And since we have been using SAS, the impact from the collection of revenue has been measurable and the results have been astounding. We have finally been able to reverse the collection trend and improve the TER. After so many inefficient years, we have now been able to convince congress, taxpayers, accountants and our own people that the BIR has the ability to track down taxable transactions and to successfully meet the mandates of our mission. Thanks to SAS, we are a real success story!”

Improving healthcare with analytics

Sweden's free choice healthcare initiative gets a boost with analytics

Heléne Spjuth, Subject Matter Expert on Healthcare at SAS Sweden



In international circles, the Swedish healthcare system is often held up as a successful example of universal care. Today, continued healthcare reforms in Sweden focus on giving patients full authority to choose healthcare providers. Referred to as free choice reforms, goals for these programs include improving access to care and providing better services for the amount of money spent.

To succeed, the reforms will require new analytic systems for a number of stakeholders, including providers, politicians and officials, healthcare and social service payers, and patients. Each of these parties will benefit from monitoring tools for informed decision making.

The free choice reporting need

The free choice changes will require county councils and purchasing offices to forecast healthcare needs, visualize the supply capabilities, compare outcomes at multiple care units and simulate the outcome on new payment models.

Healthcare providers need tools for benchmarking and for visualizing where to establish new centers to meet unfulfilled healthcare needs.

Politicians need reporting solutions to review the overall effects of reform, such as patient satisfaction, financial effects, patient pathways throughout the system and quality improvement and access to care.

Ultimately, the success of a free choice program hinges on the patient's ability to make informed choices about their healthcare providers.

The free choice analytics solution

SAS is currently partnering with Fujitsu and Infotrek to offer a new healthcare analytics system for simulation, prediction, evaluation, analysis and ranking (SPEAR). The project is designed to analyze and monitor data for the introduction of a free choice model in various regions, counties or municipalities.

SPEAR is a fully hosted solution that comes with data integration routines, data models and a number of finished reports and key figures. The solution's four main modules include two that are available now:

- Unit comparisons publish quality indicators to the citizens so they can make informed choices about service providers. This module is also used for internal monitoring of services by key figures that focus on the essential service content so that planners, buyers, production units and politicians can follow the profits.
- Simulation provides a unique solution to simulate, visualize and communicate the different payment systems' long-term effects on the total budget either per unit or region.

Two more modules are in development:

- Need analysis helps regions, counties and municipalities with long-term planning activities by collecting data and forecasting future healthcare needs of the population using historical consumption studies in the age groups.
- Asset maps monitor the existing range of providers via a mapping tool that displays the supply of care and the analysis of patient flow moving from residence to place of supply.

The benefits of SPEAR

Currently, public administrators do not have software to model needs analysis, simulate payment models or monitor publicly funded services such as health and welfare. SPEAR allows for forecasting, monitoring and analysis for better governance, with benefits that include:

- Greater dissemination of information to all stakeholders about the service provider's performance.
- User access to default settings through a role-based login.
- Ability to simulate the effects of different management models without expensive consulting.
- Simplified routine and standard reporting so contract administrators, investigators, analysts and controllers can add more time on actual analysis and investigations.
- Ability to plan healthcare based on projected needs instead of historical production.

Without analytics and reporting, the free choice reforms run the risk of defeating policy aims and causing further gaps between social groups in their access and use of healthcare services. Analytics can help ensure the best healthcare possible for the entire population by helping to allocate resources based on need and empowering citizens with information.

More healthcare advancements in Sweden

In addition to the free choice reforms, healthcare advocates in Sweden are also focusing on e-health systems, patient safety and clinical treatment support.

Sweden's e-health movement focuses on using information and communication technologies to achieve improvements for patients, health professionals and decision makers. Patients use scientific tools for tracking and measuring their everyday activities and overall lifestyle and work with healthcare providers to report progress and work toward improving their quality of life. Sweden and other countries have found that e-health services not only analyze the best treatment options but also register exact improvements in patients' health.

SAS® Analytics can improve these systems with sophisticated statistical methods and computerized decision support. Accurate analysis can help with error and incident analysis, self evaluation and predictive modeling for clinical treatment.

SAS is also involved with regional hospitals in Sweden working to improve patient safety and clinical treatment support for e-health and on-site care. Physicians and nurses use SAS predictive models to support knowledge-based decisions on best praxis with regards to guidelines and a with reference to a database of most effective drug combinations for individual patient needs, depending on history, demographics and biological markers.



SAS Sweden:
www.sas.com/offices/europe/sweden/

Heléne Spjuth on improving healthcare with analytics:
<http://blogs.sas.com/hls/index.php?archives/32-Analyzing-Healthcare-in-Sweden.html#extended>

Patient health improves at Karolinska Institute

Huge increases in the cost of rheumatoid arthritis (RA) medicine, coupled with hard-to-find scientific documentation on its efficacy and a lack of general information on the Web, make it hard for patients to know what impact it could have on their well-being.

Using SAS, the Karolinska Institute relies on a Web-based patient self-help application and predictive modeling to determine which treatments will be most effective for certain groups of RA sufferers.

This e-health system gives patients access to advanced analytics that help them improve their lifestyles, and doctors can more accurately prescribe the right treatment for each individual patient.

More online:

www.sas.com/success/karolinska.html



Heléne Spjuth is the Subject Matter Expert on Healthcare at SAS Sweden. She previously worked as a Healthcare Analyst in the healthcare payer arena and in the purchasing offices of two different County Councils in Sweden, Stockholm CC and Gävleborg CC. Spjuth is an active advocate for analyzing information to add knowledge for better healthcare quality and patient safety.

Predict and prevent, protect and defend

Transforming defense and national security with analytics

Ian Manocha, Managing Director, SAS UK

The information age has had a dramatic impact on every facet of life, creating both enormous opportunities and significant vulnerabilities. National security is no exception. In the last century, the threats to our nation states were largely characterized by direct threats from the armed forces of other nations. Today, our security is threatened by a much more diverse set of risks, including cybercrime, climate change, international terrorism, nuclear proliferation, competition for energy, and the consequences of failed states. These risks need to be assessed and managed. When direct intervention is required, conflicts are more often asymmetric – not simple or balanced – in nature.

One of the biggest challenges for defense organizations is balancing current requirements with future demands. Defense budgets, already under pressure, are being further stressed by the economic crisis affecting government spending, and – for some European nations – by urgent operational expenditures in Iraq and Afghanistan.

Our armed forces are vital tools in the risk management armory of governments and international institutions. However, governments also look to their police, homeland security, intelligence, border agencies and international institutions to play collaborative roles in national security.

The success of defense and security organizations around the world will depend on information management and exploitation, and these concepts are already embedded in many defense strategies and doctrines across the world.

With limited budgets, tradeoffs must be made that will have great future impact. Strategic initiatives have to be weighed against other priorities such as readiness, reset, recapitalization, recruiting and retention. Operating in this new information age requires significant changes in organization, culture, skills, processes and technology. Above all, it requires the ability to make the best decisions in an increasingly tough environment.

At the tactical and operational levels, different kinds of decisions need to be made. On active service, the consequences of making a wrong decision can be fatal; on the management side, uninformed decisions can be costly.

Resource visibility, allocation and utilization present more challenges. Understanding where resources are – and where they need to be – must be factored into the decision equation.

No decisions, whether on deployment or in the back office, are completely independent of financial and budgetary impact. In times of shrinking budgets and fiscal constraints, it is more impor-

Strategic initiatives have to be weighed against other priorities such as readiness, reset, recapitalization, recruiting and retention.

tant than ever to understand the implications of decisions before they are made. Enabling the right decisions at the right time is imperative whether it is managing risk, achieving mission objectives, or securing the safety of citizens and critical national infrastructures.

SAS® software makes it possible for organizations to intelligently make these kinds of critical decisions by helping them in several different ways, including preventing cyber attacks, keeping complex programs on track, rapidly responding to workforce requirements, and many more.

Preventing cyber attacks

A military cyber-security organization has the ability to analyze masses of real-time information to stop attacks in progress. By having a clearer picture of threats, analysts can recognize attacks sooner and make more informed decisions on where to focus assets and how to best prepare for the future.

Thwarting IED attackers

A US national security agency fights improvised explosive devices (IEDs) by identifying networks that finance and deploy them. The solution uncovers and targets the operational, financial and social networks involved in IED deployment.



Operating in this new information age requires significant changes in organization, culture, skills, processes and technology.

Keeping complex programs on track

One branch of the US military re-structured its enterprise to strengthen procurement and contracting to optimize the management of a US\$27 billion investment portfolio that includes eight programs and more than 20 major projects. Personnel at all levels can now gather, analyze, report and share program performance information across the entire organization.

Rapidly responding to workforce requirements

For more than 15 years, a US international security organization dedicated to managing and retaining human resources has used SAS to more efficiently make personnel decisions and improve business processes related to retention and movement of military officers across the service branches. Using a Web-based personnel data system so that users can tabulate demographic data with instant access, they save hours – and sometimes days – in responding to requests for information.

Speeding up the flow through the supply chain

A large defense ministry is using SAS to improve management, planning and tracking through the supply chain of all of its equipment, food, clothing and fuel to its deployed operations around the world. SAS provides critical knowledge and confidence at the front line and reduces costs by avoiding duplication of orders.

Building a culture of fiscal accountability

Using SAS to understand true operational costs, a large international

security installation was able to provide more services to its tenants despite budget cutbacks. Additionally, it was able to quickly determine the impact on construction, support staff and facilities of moving several large agencies required by rationalization. The organization credited SAS with helping it to provide the true fiscal clarity needed to make sound decisions.

Directly affecting operational readiness

To demonstrate a proof of concept, a military logistics organization is using SAS to generate alternative scenarios to predict functional logistics requirements. The powerful but easy-to-use system will support brigade-level logistics officers.

Keeping national borders safe

Transforming border control can provide countries with greater security, effectiveness and efficiency. One border agency with high rates of crossings is making full use of the latest electronic technology, including SAS, to provide a way of collecting and analyzing information on everyone who travels to or from their country. Information is gathered on all travelers, passengers and crew entering

or leaving the country by air, sea or rail. It will allow the agency to identify passengers who are potential risks and alert the relevant authorities. Other technologies, particularly biometrics, will ensure that people are identified securely and effectively.

Sharing information across national borders

The European Commission has tasked a consortium, including SAS, to design and develop a situation awareness platform that will share ballistics intelligence among member states in the fight against international terrorism and crime.

Conclusion

For more than three decades, SAS has provided innovative defense and homeland security solutions that address the unique needs of governments worldwide. From defense planning and logistics optimization and predictive maintenance to workforce planning, SAS' proven analytic and data integration capabilities are used by defense organizations around the globe. As the nature of risk has evolved, and new threats have emerged, SAS is helping governments and security agencies with improved situation awareness and predictive analytics to make our world a safer place.



Ian Manocha is the Managing Director of SAS UK and Ireland, and the member of the SAS EMEA Executive Board with responsibility for SAS' fast-growing international defense and security business. A civil engineer with a military background, Manocha entered the business technology world 21 years ago. He holds a BSc Honours degree in civil engineering from Southampton University.

South African province fights poverty with business analytics

KZN government says SAS gives citizens THE POWER TO KNOW®

Riad Gydien, Vice President for Africa and the Middle East, SAS

KwaZulu-Natal (KZN) is a province in South Africa that is taking change seriously. Starting in 2004, after the democratic elections in South Africa, the KZN government was overhauled, and public officials set critical measurements for economic and human development. Areas of focus included urban renewal, sustainable development and expanded public works. The eradication of poverty was the common thread for all government programs, and strict guidelines were set for monitoring, evaluating and reporting results.

Recently, details of the administration's hard work were highlighted in a 96-page report, *The Provincial Review Report 2004-2009*. In it, KZN Premier J.S. Ndebele states, "In the last five years working together we have built KwaZulu-Natal into a land of peace and harmony, a land of expanding opportunity and a stable and growing economy. The Five Year Provincial Report aims to map the journey traveled for the laying of a solid foundation for a Democratic and prosperous Kwazulu-Natal."

Within the report, 12 pages are dedicated to detailing and describing the success of Provincial Nerve

Centre, an analytical branch of the administration that uses SAS® software for business analytics. "We continue to increase the flow of information so that our people remain informed. The promotion of greater information exchange between government and its people is the essence of democracy," says Ndebele.

The following text is excerpted from the government's five-year report.

The Provincial Nerve Centre was launched on 27 August 2008

The office of the Premier holds an oversight role in the provincial government and as such is mandated to be reliably informed of the status of government. This information should create the single view of the Province, a view transcending organizational structures and creating a reliable, timely and accurate picture of the status of the Province.

The main aim of the Provincial Nerve Centre is to provide an automated and integrated information management system that will help in monitoring and evaluating government service delivery in KwaZulu-Natal.

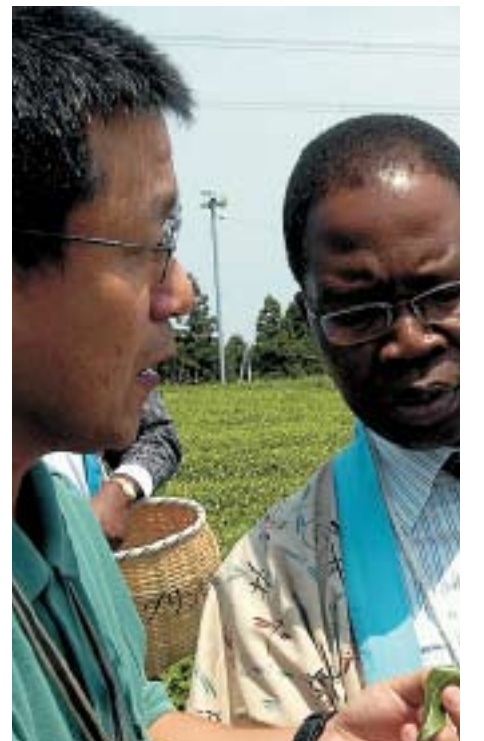


Photo credit: Provential Review Report 2004-2009

The Nerve Centre enables the Premier to view progress of all programs to reduce poverty and be alerted to any issues that crop up.

The Nerve Centre:

- Will ensure that citizens have access to information at their finger tips.
- Will offer better service delivery to the public in line with the Batho Pele principles.
- Will also empower public servants through collaborative information management and good governance.
- Will also develop efficient and responsive accountability relationships.

Monitoring and evaluation using business intelligence (BI) and geographic information systems (GIS)

The mandate of the Monitoring and Evaluation Chief Directorate in the Office of the Premier is to “monitor and evaluate the performance of government against set goals, targets, and equitableness of resource allocation, effectiveness and efficiency in service delivery across all relevant levels of spheres of government.” Monitoring and Evaluation is defined as “tracking changes in programme performance over time” and “attributing programme outcomes to their causes.”

It enables management to improve initiatives by identifying aspects that are working according to plan, yielding positive results, and identifying those initiatives that need corrective actions.

The Monitoring and Evaluation unit provides recommendations on strategic interventions required in respect of policy improvements, and provide key information to aid strategic decision-making.

The Business Intelligence solution assists the Monitoring and Evaluation

Chief Directorate to track performance with ease, through manipulation, storing and integration of data tracking performance and disseminating the information to end-users via a web-enabled environment.

Monitoring and Evaluation is strengthened through the use of Geographical Information Systems (GIS).

SAS Nerve Centre deployment goes live in KwaZulu-Natal

SAS has completed the roll-out of an Enterprise Intelligence Platform (EIP) at the office of the Premier (OTP) in KwaZulu-Natal, which forms part of phase 1 of the Provincial Nerve Centre initiative launched in 2008.

The provincial Nerve Centre provides an automated and integrated information management system complete with reporting and analytics, dashboards and geographic information system (GIS) mapping to monitor and evaluate government’s key performance indicators and to promote transparency and anti-corruption.

Delivering the 2008/09 Budget Speech for the Office of the Premier on 15 April 2008, Premier Sibusiso Ndebele stated that the Provincial Nerve Centre, which includes the development of a Business Intelligence System, would be operationalized. The Nerve Centre is one of the key initiatives to strengthen the machinery of government in the province.

Currently all provinces are mandated to reduce poverty. The Nerve Centre enables the Premier to view progress of all programs to reduce poverty and be alerted to any issues that crop up.



Photo credit: Provential Review Report 2004-2009

SAS reports extracted from the Nerve Centre may be simple ad-hoc/OLAP-based reports, for example: how many building projects are underway in a province, grouped by region, within specific time frames. Other reports may answer more complex questions such as: “What are the characteristics of the projects behind the schedule?”

Other benefits of the Nerve Centre include an enhanced citizen focus in the delivery of government services, as well as the strengthening of government-to-citizen, government-to-employee, government-to-business organizations and government-to-government relationships.

The need for analytics in government and the establishment of the Nerve Centre was largely driven by the need for improved service delivery, through reducing costs, waste and abuse and to ultimately service the citizens of KwaZulu-Natal.

The key objectives of the Nerve Centre include bridging the gap between strategic provincial objectives and the execution thereof. The system will help

to link objectives to tangible outcomes in terms of information on key performance indicators and programme outputs across departments and local government institutions.

Additionally, the System enables Office of the Premier to quantify and measure trends in departmental and provincial performance and thereby ensure that current service levels are better managed and achieved.

Similar principles are applied in health, education and all other spheres of government departments.

It will now take officials and executive decision makers a fraction of the time

to extract the valuable intelligence they need, from a variety of sources, that will then support fact-based decisions needed to deliver better, more proactive services to the public.



Riad Gydien is the Vice President for Africa and the Middle East at SAS. He has spent most of his career working within the business intelligence industry, and has extensive knowledge of how analytics can improve the operations of a business. Prior to joining SAS South Africa as Country Manager in 2007, Gydien held senior positions at South African-based Fios and Sekunjalo, on top of serving a tenure in Saudi Arabia as head of Sales and Marketing at Thimar Al Jazirah.

Singapore strengthens communities with SAS®

Analytics helps government agency offer something for everyone

The People's Association plays an important part in Singapore's nation-building efforts. It creates opportunities for people from all walks of life to meet and form friendships essential to mutual trust and cooperation. By encouraging people to take ownership of their community, the People's Association brings people together to create a more cohesive and resilient Singapore.

"Our task is to bring people of diverse backgrounds together. We achieve this by offering a range of programs and activities: from lifestyle courses, to sports programs, community events, community services, social services and more. These programs serve to deepen social engagement among residents and help to build a stronger sense of community," says Tan Boon Huat, Chief Executive Director. "We offer a wide range of programs. We like to say we have something for everyone."

Because the People's Association offers such a wide range of community activities through a network of more than 1,800 grassroots organizations, the agency collects a huge amount of information about participants, such as the sort of activities each of them enjoys, as well as demographic information.

Working with SAS, the People's Association implemented an enterprisewide intelligence platform that puts that valuable data to use for analyses that help the agency hone its community-outreach efforts.

"It's important for us to have ready access to information because you need to know where you are at any point in time," Tan explains. "Then you will know if you are moving toward your target or not. Easy access to such information helps us adjust what we are doing and be more responsive, as necessary, to the community."

The People's Association implemented SAS for Performance Management to achieve short-term objectives and long-term strategic goals. Coupled with SAS Customer Intelligence, PA's management team is better able to measure the efficiency and effectiveness necessary to attain its vision as well as to live up to the mission of the statutory board.

"We wanted a system where the collection and entry of data was simple," Tan says. "SAS gives us a standard platform from which we can extract the data and slice it and dice it in whichever form we want to see it – by ethnic profile, by age

profile, by neighborhood profile – any way that is useful to us."

Developing a robust intelligence platform has enabled the People's Association to gain the maximum value from its information assets.

"Being able to work with information – to see it from different perspectives – has enabled us to do things in new and surprising ways which we have not thought of before," Tan says. "It reveals from many perspectives exactly where we stand. Before you can move in any direction, you must know where you stand and where you are at any point in time."



Managing program performance in government
www.sas.com/apps/whitepaper/index.jsp?cid=3564

SAS Singapore
www.sas.com/offices/asiapacific/singapore/

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Tan Boon Huat, Chief Executive Director, People's Association



Helping citizens

From eradicating extreme poverty and hunger to reducing child mortality and ensuring environmental sustainability, social services agencies around the world use SAS to help improve the lives of citizens. In Belgium, Australia, Mexico, Malaysia and nearly everywhere in between, you'll find SAS Analytics helping agencies make a difference. Examples include:

- A network of 123 family assistance offices in one European country uses SAS to preserve financial equilibrium in the payment of services and to understand the increase in service allocations. The agency gained better knowledge about affected citizens and improved quality of service with better data on housing, household conditions and more.
- The ministry of agriculture in one Asian country uses SAS to improve the quality of market intelligence on agriculture produce, help farmers optimize production and planting, and reduce potential crop losses due to over or undersupply.
- A large water administration department in Asia uses SAS to extract and consolidate data from multiple water collection points and provide a scientific basis for decisions regarding flood control and drought relief.

Learn more about SAS supporting humanitarian goals:

www.sas.com/sascom-unpaper

Fighting drug abuse with data analytics

Drug and Alcohol Action Team uses SAS® to tackle drugs and save lives by improving joined-up delivery

As any public servant knows, the best efforts to help people in need often require cooperation from multiple agencies and organizations. When those agencies can put shared data to use in their efforts to solve problems, they can often make improvements more quickly and provide help to even more constituents.

One successful example is the London Borough of Croydon's Drug and Alcohol Action Team (DAAT), a multiagency effort that uses SAS software to achieve better results in its efforts to:

- Get more people into drug treatment.
- Reduce drug-related crime.
- Empower the local community to resist drug misuse.

In particular, SAS gives the DAAT greater insights to commission services more effectively and to target the borough's resources where they can have the biggest impact. SAS delivers a more "joined-up" approach to allocating treatment across various agencies, which results in the most effective treatment being more quickly assigned to users who really need it.

As a multiagency public sector partnership, Croydon's DAAT unites representatives from the local council, health service, police and criminal justice system, and the voluntary sector. SAS software helps the DAAT to plan treatment modernization services that deliver effective treat-

ment structures for substance misuse and ensures that the work of local agencies and cross-agency projects are integrated successfully.

SAS software also helps the DAAT to automate statutory "Green Reports" for the National Drug Treatment Monitoring System as well as key performance indicator (KPI) reporting against national Home Office targets. As a result, operational effectiveness at the local level is improved by cutting administration time from over a week down to half a day.

With SAS, the DAAT can perform analysis in line with national KPIs for drug treatments, monitor the local agencies' performances and explore new ways to deliver improved treatment structures within their very tight budgets.

"By using SAS, we can analyze the success and failure of specific treatment programs and see whether our treatment structure actually meets the needs of the local population," says Ray Rajagopalan, Data Manager at Croydon's DAAT. "SAS saves us time by being able to immediately detect weaknesses in the system rather than waiting a year or more before an issue becomes apparent."

With the ability to pre-empt problems and do things at a much quicker pace, DAAT employees can identify early indicators and take corrective actions sooner in the reporting cycle. "SAS soft-

"By using SAS, we can analyze the success and failure of specific treatment programs and see whether our treatment structure actually meets the needs of the local population."

Ray Rajagopalan,
Data Manager, the London Borough of Croydon's Drug and Alcohol Action Team



ware enables DAAT decision makers to get on with sorting problems out, making changes and reallocating resources to improve the local treatment system and provide more effective front-line services," says Rajagopalan.

Before SAS, the DAAT used basic tools such as Microsoft Excel and Access, which were unable to manage its growing volumes of data or quickly provide the comprehensive analysis needed.

Rajagopalan continues: "Having proper analytics from SAS provides us with a range of benefits that we never had before. It is improving the time scales required to produce comprehensive analysis."

Ian Manocha, Managing Director of SAS UK, states: "It's an honor for SAS to be an integral part of the DAAT process in tackling drugs and ultimately saving lives. It's great to see that our strength in analytics can help apply resources

in the best way and change the lives of real people for the better."

SAS Business Analytics software was implemented by SAS partner Base 3.

 **ONLINE**
Croydon's Drug and Alcohol Action Team
www.croydondaat.org.uk/

Base 3
www.base3.com/

Government statistics near and far

Statistics offices benefit developed and developing countries

Marie Lowman, Director of International Development, SAS



More than 75 different countries use SAS in their statistics offices.

Four of the most impoverished countries in the world are now using SAS solutions to make fact-based decisions to help their struggling populations. Thanks to the unique partnership between SAS and Statistics Norway, the statistics offices in Moldova, Eritrea, Malawi and Uganda are building and supporting statistical capacity, enabling the governments to support the fundamental needs of their populations.

Statistics Norway is the central Norwegian office for governmental statistics. Through its international development division, Statistics Norway has cooperated with sister organizations in developing countries for more than a decade and contributed to the development of their statistical systems and capacity building. This contribution involves the strengthening of individual skills as well as developing the national statistical office as an institution.

High-quality statistics contribute to economic growth, poverty reduction, good governance, democracy building and international comparability.

The partnership program through SAS and Statistics Norway offers low-income or low-middle-income countries SAS Analytics Pro software. Statistics

Norway provides staff members that travel to the recipient country and remain on-site to provide the necessary installation and knowledge transfer to use SAS. Using SAS, the statistics offices can identify their populations' needs and disseminate the information to the necessary government, public, private and nonbusiness organizations.

Statistics offices around the world

The United Nations Statistics Division lists profiles for each country statistical office around the globe. Country profiles include a history of the country's statistical system, its legal basis, details on the statistical program and much more. You can browse country statistical office profiles at the UN site: unstats.un.org/unsd/nsoprofiles/default.aspx

Tellingly, more than 75 different countries use SAS in their statistics offices for programs that range from census analysis and government reporting to financial planning and resource planning. Continue reading to learn about some of them.

The Australian Bureau of Statistics uses SAS to ensure the integrity of data and statistical outputs across many divisions. John Preston, an Assistant Director in the Methodology Division

says, "Many of our collections have thousands of units – a unit being an individual or business – and with such a high number of records, SAS makes our tasks more efficient, especially as many of the procedures we require are already pre-programmed into SAS." Read more: www.sas.com/success/abs

Statistisches Bundesamt, the German Federal Statistics Office, replaced older, non-portable mainframe programs with SAS products, including customized applications. "The SAS solutions covered both our basic types of work – short-term ad hoc analyses as well as periodic evaluation processes – better than all other products available on the market." Read more: www.sas.com/success/statistische

Statistics Denmark uses SAS to collect and analyze census data without knocking on doors or asking any questions. Instead of a traditional household-based census, Denmark's tallies are completely register-based. "We run SAS on all of our systems and it plays a vital role in our processes," says Lars Thygesen, Director for User Services at Statistics Denmark. Read more: www.sas.com/success/statisticsdenmark

The US Census Bureau uses SAS to create person-level and household-level files for each US state and to merge records so analysts can look at components of a household. Next, analysts merge that data with geographical information so they can analyze by geographical hierarchy. Read more: www.sas.com/success/census

 **ONLINE**
UN statistical office profiles
unstats.un.org/unsd/nsoprofiles/default.aspx



Marie Lowman, Director of International Development at SAS, develops and manages statistical capacity building programs with governmental and non-governmental organizations. Through the use of technology, Lowman assists developing countries and emerging markets to make fact-based decisions to help alleviate poverty, target healthcare gaps and help ensure all children receive a primary education.

Educating for global competitiveness

Five policies for meeting the education challenge

Jim Goodnight, CEO, SAS and Mark Milliron, CEO, Catalyze Learning International

To meet global competition, it is often argued, a nation must spend more on education. While that is true, what is even more important is how the money gets spent. We believe there are five guiding principles for evaluating 21st century educational policies.

From Boston to Bangalore to Beijing, education is the engine of economic growth. Whether we are discussing poverty alleviation, anti-terrorism or innovation, the discussion must begin with education.

There is legitimate concern in both Europe and the US that our education systems are not fully preparing students and communities to thrive in today's knowledge-based economy. Indeed, if communities and countries want to prosper on the road ahead, we must support bold, innovative and transformative education policies and practices.

In the political debate over education policy, "bold" often gets translated into "expensive." Certainly, governments must increase their investment in education at all levels – primary through lifelong learning. While endowments and competition are important factors in the success of higher education systems, other success factors include the openness and diversity of institutions, each with very different missions, as well as the freedom and resources for university professors

to pursue their academic interests. This culture of innovation and creativity is at the heart of the system's success.

Wrong models for the information age

The economic crisis has slashed endowments and budgets across the board, but the fundamental issue has always been how that money gets spent. The postwar tradition in Europe has provided an industry factory model that seeks to provide education for all students. With a few shining exceptions, the practical result has been an increasingly mediocre university system. While the US system, with its declining taxpayer support and commensurately skyrocketing tuition, is not an acceptable alternative, what is indisputable is that competition in education creates world-class institutions, just as competition in business creates world-class companies.

Most of our schools in Europe and the US are using an industrial factory model on an agrarian calendar trying to meet the needs of an information age. We are trapped in old models designed for a very different time. Our arguments are too often about finding funding rather than fundamentally redesigning the educational system. We expend too much energy testing the outcomes of outdated models and too little energy trying new technologies.

Governments and stakeholders must examine the policies, programs and practices in education systems and ask the hard questions about whether they are improving or expanding learning and, more importantly, how one even knows. In the 19th century, countries that wanted to compete in the industrial economy founded and funded secondary schools, tertiary schools, community colleges and adult-training courses.

Today, education still matters for economic competitiveness. As the 2008-2009 World Economic Forum recently underlined in its Global Competitiveness Report, "Lack of basic education can therefore become a constraint on business development, with firms finding it difficult to move up the value chain by producing more sophisticated or value-intensive products."

"Quality higher education and training is crucial for economies that want to move up the value chain beyond simple production processes and products. In particular, today's globalizing economy requires economies to nurture pools of well-educated workers who are able to adapt rapidly to their changing environment."

Now, as the creative economy continues to emerge, we need to ask: What now should we initiate and fund?

Most of our schools in Europe and the US are using an industrial factory model on an agrarian calendar trying to meet the needs of an information age.

Education is struggling to deliver what is needed

Governments, industry and educators on both sides of the Atlantic have raised alarms about the inadequacies of their educational institutions in addressing the needs of the 21st century work force. In the US, many are concerned with the deficiencies in science, technology, math and engineering education; they are calling for expansive legislation to address K-16 education reform, research and immigration issues. Similar concerns exist in most EU countries: Many are struggling to devise and gain the acceptance of reform programs by their educational establishments.

What are the necessary skills for the 21st century?

SAS is a global company with more than 11,000 employees worldwide in more than 400 offices around the globe. In our experiences as business managers and leaders, we've learned that determined students need at least three essential skills to succeed: intelligence, creativity and courage.

There is something about the confluence of these skills that holds the promise of making a difference for students, communities and countries.

How do the three skills relate? Intelligence – and more precisely intelligent analytics – need to be allied to creativity and endowed with courage.

1. Intelligent analytics

Intelligence is not defined in the classic sense; it's defined as the tough-minded tools for living and learning, the ability to absorb information and

assess its sources, and the skills to synthesize, analyze and use it to make decisions. More and more schools are looking to build these broader skill sets in their students' use of information from data mining to analytics to decision making. They need this intelligence – particularly analytical and critical-thinking skills – to be able to live in a world awash in information.

The *Harvard Business Review* referred to this skill set as the ability to "compete on analytics." The phrase comes from the work of Tom Davenport at Babson College, who analyzed a host of companies from Amazon.com to Marriott Hotels that are using analytics to make a major difference in how they compete and win in the marketplace.

Some would argue that analytical skills have always been essential for science, technology, engineering and math. To reach the highest levels of each, one needs to be able to analyze data, learn and adapt. Now, because of the daily processing of massive amounts of information, these skills may represent the difference between success and failure.

2. Allied to creativity

Students and citizens also need the creativity skills to be able to process and produce with this information. As social theorist Richard Florida argues, every person has a creative or artistic side. It is unleashing this creativity in the context of analytical ability that holds powerful promise. Unfortunately, this need for creative stimulation often gets lost in the hue and cry to make more scientists and mathematicians.

3. Endowed with courage

The final step, however, is courage to take action; to dive into the sea of transformation that is flooding our worlds. The hard work begins in boldly engaging difficult conversations, involving broad constituencies and moving toward thoughtful solutions. In the IT business, we know that we will fail without a hard turn in R&D, a change in sales strategy or a new approach to cost containment.

In the US, the Partnership for 21st Century Skills has developed a vision for learning in which students focus on core subjects including math, science and foreign language. In addition, other content must be included and cover topics such as global awareness, finance, economics, business and entrepreneurial literacy. There needs to be a strong emphasis on learning and thinking skills – critical thinking and problem solving: communication, creativity and innovation, collaboration, contextual learning, information and media literacy, e-skills and life skills.

As part of teaching critical thinking and problem solving, as well as fostering entrepreneurial literacy, educators must teach young people to take risks. And policymakers have to create a landscape that rewards those who take risks and makes failure an acceptable cultural and financial option.

Policies for meeting the challenge

We need to take a step back and focus on policy and practice that will build a lifelong learning system for the 21st cen-

ture. Our policy must be focused on the goals of student access and success, workforce readiness, research and development infrastructure, global literacy and essential disciplines.

Moreover, we have to throw out our attachments to the way we have always done things in education. Our focus on practice needs to be driven by two tough-minded questions: (1) Does this practice improve or advance learning? (2) How do we know?

Five priorities will help deliver the desired answers:

1. Ensure access to education and training:

- Make education and training widely available anytime and anywhere (on-site, online and just-in-time). We need to be open to supporting new models, different providers, and broad-based primary, secondary, postsecondary and business partnerships that increase educational access.
- Communities and policymakers must foster lifelong learning by providing flexible and varied educational opportunities, and access to the necessary knowledge and skills at any point in an individual's lifetime.
- Invest in pre-primary education programs, which have historically provided the best return on investment. The earlier a child learns to read, the better. All other learning hinges on the development of that one skill.
- Ensure access to higher education for all by providing the economically disadvantaged with government-supported financial aid.
- Ease transferability of students in higher education – both from country to country and from discipline to discipline.

2. Continually assess education performance in relation to goals, that is, learning and earning:

- Create strong accountability and transparency in our education systems.
 - Put accountability systems in place that will provide educators with insights on what happens to students after they complete their educations, transfer to other universities or take jobs. Discern whether these students have the necessary skills to gain and maintain employment.
 - Support policy that rewards evidence-based educational transformation.
 - Enable governments and educators with the tools that will allow them to gather data, analyze that data and create policies based on firm knowledge of which policies will create desired outcomes.
- #### 3. Implement consistent policies that will ensure workforce availability:
- Enact a “human capital” tax credit for employers who provide training and education for workers. This will have the dual effect of lowering the public cost for training and education while providing an incentive to employers to commit to lifelong learning.
 - Develop a curriculum that supports essential disciplines like science, technology and engineering while addressing the emerging need for global literacy.
 - Provide scholarship assistance, teacher institutes and mentoring programs to encourage more participation from those with experience in business or civil society to become teachers.
 - Create a labor policy that has enough flexibility to allow for necessary worker redeployment.

- Provide a tax structure that rewards companies for engaging in R&D activities.

4. Advance innovative research and development:

- Concentrate government funding on basic research.
- Ensure research results are open and available to the public through online databases that would allow access by companies and academics alike.
- Allow university researchers to license and retain the intellectual property they create in order to found a commercial venture.

5. Promote social, state and global business/education partnerships:

- Work together to enhance the use of technology in learning and to develop the information technology skills necessary for the workplace. Ensure that computer and technology skills become a part of the education and lifelong learning curricula.
- Provide incentives for business to participate in school mentor programs, “adopt a school” programs or community-based initiatives.
- Embrace best practices from other regions of the world that have hard data to substantiate results.
- Foster a culture of innovation and reward risk-taking at all levels.

Educate for creativity

We must help in creating innovative educational institutions of the 21st century where technology infuses every part of the curriculum, where creativity and innovation are fostered in every discipline, and where students and educators are constantly striving to solve problems through original thinking.



It is the creation of new ideas and solutions that, ultimately, will lead to new industries and jobs for the 21st century. The productivity and competitiveness of every nation depend on it.

Research suggests that spending on pre-primary education brings the greatest return on investment, followed closely by spending on primary schools. But if money were the answer, we would have already been able to calculate how much it would cost to optimally educate a student.

Our area of focus needs to be on fostering and growing creative capital. When we talk about creative capital, we're talking about people. Creative employees pioneer new technologies, give birth to new industries and power economic growth. Today, as we talk about maximizing performance, be it educational or corporate, we must keep in mind that people – and the creative capital they represent – are a critical part of the equation. The creative economy is here to stay, and societies that best educate for creativity will have a crucial advantage in the ever-increasing competition for global talent.



ONLINE

SAS education customers:

www.sas.com/success/indexByIndustry.html#0800



Outspoken on education reform, SAS founder and CEO **Jim Goodnight** sees education as critical to the success of people, organizations and nations. Goodnight holds a doctorate in statistics from North Carolina State University, where he was a faculty member from 1972 to 1976. His passion for learning has since led him to endow several NCSU professorships and make education the focus of SAS' philanthropy.



An award-winning leader, author, speaker, and consultant, Catalyze Learning International CEO **Mark David Milliron**, has championed innovation and excellence in education nationally and internationally. Milliron previously served as Vice President of the Education Practice with SAS.



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