Performance Management meets Business Intelligence

Panoratio Information Discovery

White Paper

An Analysis By

www.wolfgang-martin-team.net

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1 Management Summary

Organizations are complex constructs that, especially in the context of international competition, are under growing pressure to make better decisions faster while dealing with constantly increasing amounts of data and information. The dynamics of today's markets being what they are, early recognition of internal as well as external changes is a critical lever for their success. Since the 1980s, Business Intelligence systems have played a role in this. The phrase Business Intelligence (BI) itself wasn't brought into play until the 1990s; prior to that, organizations referred to them as Decision-Support Systems. The data required for BI was supplied by the data warehouse.

The original idea behind BI tools was to provide both management and business users with the methods and mechanisms necessary to enable their independence when it came to approaching analytical problems. In many cases, however, these expctations remained unfulfilled. One barrier to successful BI was the disconnect between the analyses and reports they were able to generate and their actual business relevance. The link between operational metrics and the actual business processes was missing. So while the results BI could generate were ‚interesting', they were also only of limited use. Feedback mechanisms can only be effective if they actually do close the loop – if that isn't the case, managing and guiding business processes is impossible. **One of the critical success factors for BI is presenting information in their context to business processes.**

Information that is derived from business processes enables analysts and process owners to oversee these processes effectively. With this data, process owners and executives are aware of the current status of every process and are able to, in a timely manner, make adjustments when problems arise. This allows for significantly improved decision-making. Business Intelligence should be available as a tool for every employee.

BI und Business Process Management are two disciplines which are now beginning to merge. Traditional BI is evolving into Performance Management.

Performance Management is a strategic discipline that enables companies to continuously adjust their goals and processes to keep them aligned with each other.

Another barrier to successful BI was the lack of acceptance of its tools and methods on the employee side. A pivotal argument in this regard has been the inadequate performance of these tools – especially regarding ad-hoc queries involving significant amounts of data. As many surveys and market analyses have demonstrated[1], queries requiring over two seconds for answers are already considered borderline, those over five seconds cause users to lose

[1] Such as this OLAP survey: http://www.barc.de/de/news/barc-news/article/2006/11/20/neu-the-olap-survey-2006.html

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interest. **One of the critical success factors for BI tools is their ability to allow analysis of even huge amounts of data very quickly.**

This becomes of even greater importance in fast-moving markets as well as in so-called ‚transitional markets', experiencing significant merger and acquisition activity. The ability to analyze effectively here is critical, as decisions must be made much more rapidly than in traditional, slower-moving markets. Also important is a clear internal picture of one's business processes, the external view of customers and competitors as well as the ability across the company as a whole to innovate. To tie all of this together, companies must base their strategic and operational decisions on facts – which can only be come by through flexible, and rapid, analyses across all available data sources.

Panoratio – the Principles

Panoratio has developed a technology which satisfies the above requirements across the board. Their technology is based on a patented process derived from the theory of statistical learning. It enables analyses of data sets ranging from small to very large through the interactive visualization of data not only for power-users, but also for occasional business users, as numerous Panoratio customer case studies demonstrate. Panoratio's technology extends far beyond the classic OLAP approach, as the modeling of the OLAP cubes occurs automatically. Data is saved in a proprietary format, the Portable Data Insight (PDI), allowing the old prerequisite of BI – in principle, all employees can use PDIs. Panoratio's PDIs ensure that business-critical analyses around fraud, risk management, and sales patterns are no longer wholly dependent on IT and are available to and can be used by a broader majority of employees.

Panoratio – the Background

The foundation for the PDI technology offered by Panoratio today was laid in Siemens' research lab for ‚artificial intelligence and machine learning'. In 2001 and 2002, the concept behind the technology was developed, and its development incubated within Siemens. In March 2003, Panoratio was founded and spun off from Siemens, with the goal of developing the leading-edge technology to into a robust product, actively market it and continually improve it.

Conclusion: Panoratio's technology is an attractive and competitiveness-increasing technology for all companies operating in transitional markets. It is when market dynamics, competitive forces and the pressure to innovate are at their most complex, that BI tools are a must-have for business users and at the executive level. Tools like those offered by Panoratio are a prerequisite in order to survive and thrive in such markets. Companies in markets such as multichannel enterprises (such as retail, banking), telecommunications (including media, cable and wireless), healthcare or engineer-to-order manufacturing as well as those experiencing significant growth in terms of new sales channels or entry into new markets should evaluate Panoratio's technology for their analytical needs.

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Getting to the Essence of Your Data

The paradox around information is that, on one hand, the ever-increasing **flood of data** most companies generate means that they possess more data today than they can actually process and analyze. On the other, however, the data they've amassed lacks the integrity, consistency and quality they require to analyze them effectively. In many cases, the key data point needed in a particular moment is not available, not correct or can't be located. This results in managers and executives alike who claim an inability to filter what's important to them out of the data noise surrounding them – and more often than not blame IT for it.

Additionally, the value of information stored by companies is further lessened by their heterogeneous approaches to data storage and management. In the 1990s, companies oriented themselves around applications. All company-relevant data was supposed to be stored in a database, as were all business processes through the standardized functionality of an ERP system. In the meantime, companies have learned that this approach can't work. Instead, most organizations now must navigate a heavily cluttered landscape of application and data warehouse silos. Medium-sized enterprises average around fifty such silos, large internationally-operating companies must deal with hundreds, sometimes thousands of disconnected information silos. The consequence of this approach is **data fragmentation**. With every application possessing its own metadata and master data sets, none of the informational puzzle pieces actually fit together.

1.1 Striving for Agility

Aside from the twin challenges of too much data and its fragmented nature, a third is increasingly gaining in importance – the agile management of that information. Quick, targeted initiatives can bind customers more tightly and help companies gain competitive advantages and are therefore critical success factors given current market dynamics. Informational agility is also a key to successful mergers, acquisitions and outsourcing of non-core business. Additionally, the rising pressures companies face to reduce capital and operating expenses, increase revenues and adhere to regulatory legislation can be mitigated by the organization's ability to effectively parse and manage its data. This is why market-leading companies are concentrating their efforts on operationalizing their strategies through consistent, intelligent and industrialized business processes. Because the performance, quality and flexibility of a company's processes directly correlate to its ability to compete and thrive, they are a focal point for management. Successful companies are process-oriented companies. Processes connect a customer's customers to a supplier's suppliers. As with most things, the devil is in the details – and, in this case, the advantage lies in effectively managing business processes.

One can, however, only manage what one can measure. This is why **Performance Management** is critical. PM is a closed-loop model based on Business Intelligence and

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designed for the optimal planning, monitoring and guidance of business processes on the levels of operations, tactical decision-making and strategy. Its foundation is the principle of correlating metrics to processes and starts with the design of operational processes. Metrics must be derived and developed simultaneously with those operational processes. Goals must be made measurable. The achievement of those goals needs to be continuously monitored. Measures must be taken to continuously adjust processes towards achieving those goals.

Performance Management is defined as an operational model that enables companies to continuously calibrate organizational goals and business processes to each other. (Fig.1)

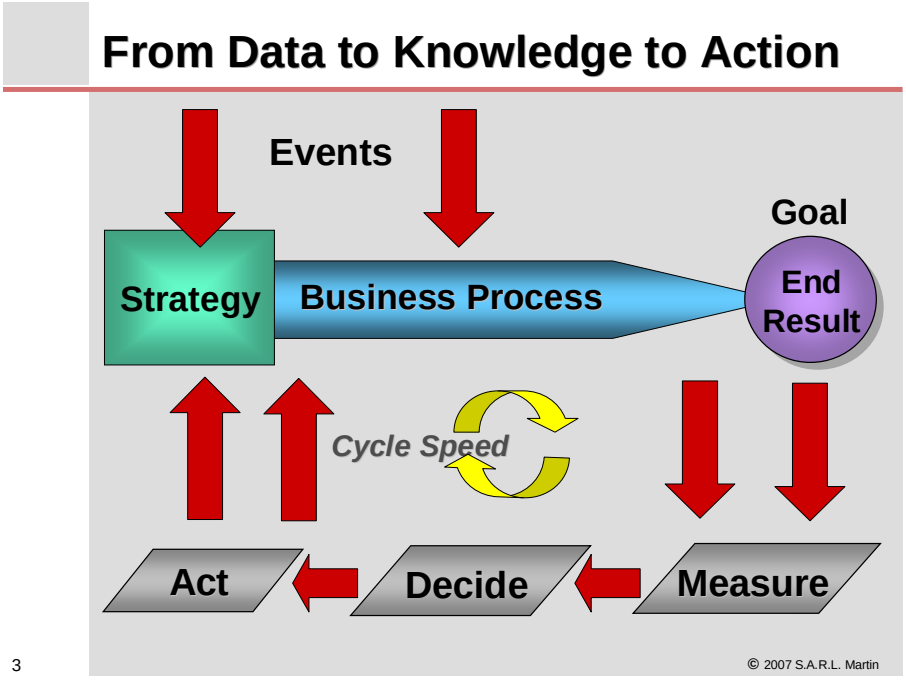

Figure 1: Performance Management is a top-down closed-loop model for information-based management. Measurable goals are derived from corporate strategy. Based on strategy and goals, processes and metrics are developed in parallel to guide management of the business and continuous improvement efforts. The results of those metrics results cause decisions, of either a manual nature or guided by established business rules. These decisions lead to measures designed to steer processes and their sub-processes (tactical and operational) as well as adjustments to strategy and goals (strategic), thus closing the loop. Here, the synchronization between measurement and process execution is key – the speed of the measurement process must correlate to the speed of the of the business processes themselves.

The challenge facing Performance Management initiatives is therefore one of accessing business data in a manner timely enough to be able to monitor and guide the business processes generating that data. Within the jumbled landscape of application and data warehouse-based information silos, this is no luxury that is no longer affordable The reasons

for this are evident – data warehouse solutions historically were, and in many cases, still are designed with a departmental perspective in mind. The business semantics, however, that have evolved over time in these different departments are not compatible and have to some degree been generated by different tools from different vendors.

This obviously complicates any data warehouse consolidation efforts, perhaps even makes them impossible. So even if, to some extent, visibility into business operations is possible, a consistent 'top-down' view isn't a possibility – at the corporate level, numbers don't add up, the same goes for operational metrics, especially if processes flow through departmental and even company boundaries. The opportunity cost for this is a high one, since companies should be able to answer questions such as

- Which suppliers are critical for production? To what extent will issues with them impact production – for days? Or weeks? What'll that cost us?
- Who are our most valuable customers? Do we offer them better service in order to bind them more closely to us?

Conclusion: Business-critical elements like increasing profits, making more effective decisions and innovating are all underpinned by information and the ability to manage it effectively. The challenges organizations face in this regard are the massive amounts of data they generate and collect, the heterogeneity of their data sources and managing their information with agility in the context of process orientation.

1.2 Mastering Data Complexity

Once these challenges have been surmounted, the question remains as to how ultimately one gains insight into that data, understands and interprets them and, finally, identifies and extracts the causalities and patterns within them. It's not a new question – how do you turn data into information and generate knowledge from them, Knowledge organizations can use for operational process and overall guidance?

There are two alternative, if ultimately complimentary, approaches. One is the mathematical/statistical and data mining approach, centered methods. The other is the interactive and visual approach geared around people. Interactive data visualization supports the human eye via an intuitive, visual interface and its collaborative and visualization services. Provided with the right support, the eye serves can serve as an excellent detector of patterns and structures. Interactive data visualization can therefore be utilized as an efficient way of mastering data complexity when

- A high level of interactivity is given,
- Large, even huge data volumes need to be displayed graphically within seconds,
- Queries can be configured dynamically, flexibly and intuitively,
- Teamwork in general and the distribution and consolidation of work deliverables specifically is well supported,

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- Configurable and dynamic access to different data sources is possible, and
- Visualization techniques lead the human eye quickly to significant patterns and shifts.

Data visualization is an excellent tool for business users and for management, as it realizes an old requirement of BI tools – it enables even the occasional user look for answers quickly within an organization's existing data. Interactive data visualization is an extremely flexible and scalable approach to analytics. It serves as an ideal complement to statistics and Data Mining and is superior to any traditional BI approach such as OLAP, because the unknown can be addressed and visually identified without needing to model new OLAP cubes. This provides both business and executive users with a high degree of independence, flexibility and speed in regards to the operationalization of analytical results without always being dependant on company IT.

Developing solutions and making decisions is a team effort. Supporting collaborative teams in regards to interactive data visualization is a critical success factor. Collaborative services like information distribution, publication, notification, annotation, versioning as well as dynamic queries and the extension of the virtual data room are indispensable. Interactivity, visualization and team work are difficult to describe, one must see and experience them to understand. The points mentioned above should, as a next step, be experienced by analyzing one's data through interactive data visualization!

Conclusion: Interactive data visualization is an ideal complement to pure statistics and Data Mining. It utilizes and supports the human eye as a discriminator and detector. This enables even the occasional business and executive user to extract knowledge quickly, flexibly, and intuitively from existing data - and to do so mostly independent from corporate IT.

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2 Panoratio Information Discovery

Panoratio's PDIs enable interactive data visualization, which solves many of the issues that have often caused traditional BI to fail.

Why are Panoratio's PDIs a critical success factor?

- Traditional BI tools were static and oriented towards the power-user, leading to a lack of involvement regarding the business user, which in turn meant that the real business demands of the organization were not being addressed. This demonstrated BI's absence of business relevance. Interactive data visualization via PDIs clearly puts people at the heart of analytics. The results provide actionable answers to urgent questions and are therefore fully relevant to the overall business needs of the company.
- Traditional BI tools inseparably link data as well as the analytical processes necessary to create information. This results in complexity, lack of flexibility and the complete inability to innovate**,** also causing user acceptance of the tool to sink drastically. This is fundamentally different with PDIs – data and analytics have been completely decoupled from one another. This decoupling provides the necessary flexibility to enable connecting queries easily and intuitively with another, and, because Panoratio's technology enables the seamless joining of multiple PDIs to each other, allowing analysis across data sources previously silo'd from each other to do so across multiple PDIs.
- Business Intelligence does not use a coherent approach around covering operational issues. Traditional BI requires a data warehouse as the only source of reliable, high quality information. This meant that BI could not be utilized in an operational context and was only of use for isolated tactical and strategic analyses. The potential creation of value through real-time analysis remained untapped. PDIs can utilize both data warehouses as well as operational data sources, no longer limiting the amount of data the user has access to.
- Business Intelligence was backwards-looking. Its focus lay in analysis and diagnosis. The potential of predictive modeling for the opportune identification and avoidance of problems and risks remained unutilized.

  Example. A medium-sized manufacturing company analyzes production quality at the end of every shift. This rapidly identifies potential production weaknesses and allows the derivation of measures that ensures elimination of these error sources during the next shift. Proactive BI creates a clear added value here.

  Interactive data visualization via PDIs represents an ideal instrument for proactive analysis, as it is designed to discover and extract unknown patterns. In other words, the PDI concept is intended for a proactive approach.

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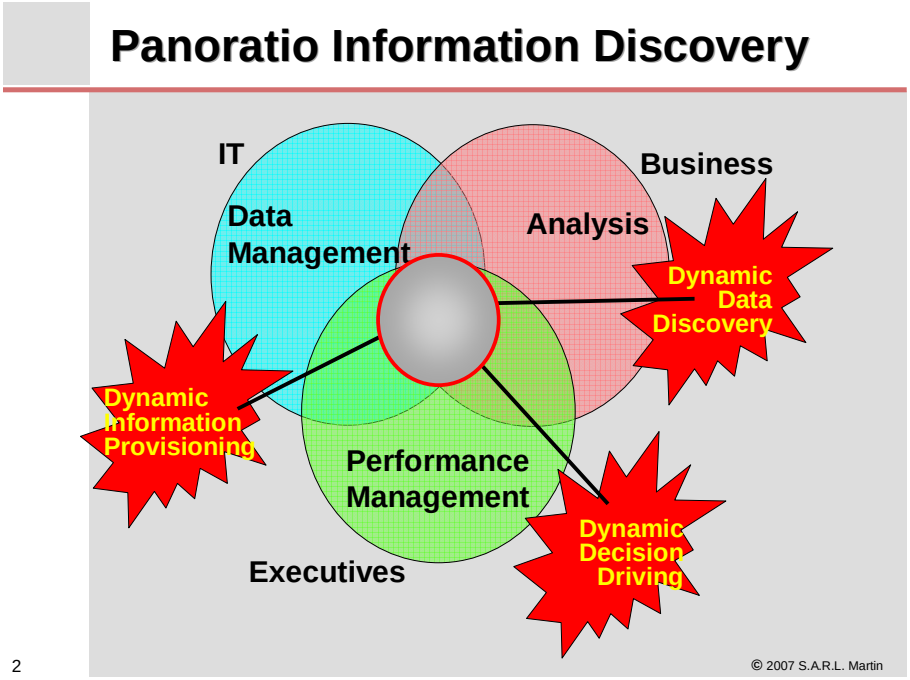

Figure 2: Panoratio Information Discovery consists of three sub-processes based on IT data management which enable both business and management users to independently analyze and interpret large or even very large amounts of data in order to identify unknown patterns and then use these insights to derive appropriate measures. Dynamic Information Provisioning describes the sub-process of unifying data from heterogeneous sources. Dynamic Data Discovery describes the analysis-sub-process, which can be understood as visual, interactive Data Mining. Dynamic Decision Driving is the third sub-process, outlining the decision-making process and the operationalization of those decisions.

- Business Intelligence tools have historically not provided the information user with enough actionable information, either because data was not accessible (or access was being restrained) or users were inundated in data. Both phenomena led to a drastic decrease in acceptance for these tools. The PDIs are instruments for information syndication and distribution within the context of collaborative, team-orientation and quickly create the necessary buy-in on the user side. .
- Traditionally, Business Intelligence has had tool-oriented approach. Every analytical component played its own role within an isolated environment, creating incompatibility as well as inconsistency and ultimately leading to informational silos. This meant that figures across the company no longer squared up. With the PDI technology, however, different data sources can be unified and analysis across various PDIs enabled. It must be noted that these PDIs need to be based on the same set of business semantics.

The advantage of the PDIs lies in the ability to fuse different, often isolated from each other data silos. This process bears closer examination.

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Conclusion: Panoratio's PDIs essentially redefines Business Intelligence. The original driver behind the creation of BI – basing decisions on facts – can now be realized and through interactive data visualization.

2.1 Dynamic Information Provisioning

This sub-process within the **Panoratio Information Discovery**, describes data management as enabled by PDIs. As Figure 2 has already shown, this process is mainly owned by IT, but still allows business and management users a certain level of flexibility. PDIs can even be used by business users during the data preparation phase, as an excellent method for Data Profiling, i.e. gaining insight into the actual quality of company data. This process is supported by PDI functionality like aggregating and segmentation, which allow initial insight into the state of existing data.

A high-grade data compression, with a factor of 1:100, occurs within the Dynamic Information Provisioning process, which is why PDIs also lend themselves for archiving analytical data sets. The ability to fuse several PDIs together also makes it possible to integrate and analyze across various sets of data. It is also important to note, however, that IT needs to have performed some preliminary data management efforts - a consistent and established set of business semantics must be in place. This can be achieved through an overarching metadata management approach.

2.2 Dynamic Data Discovery

This sub-process entails the actual analysis performed by business users. Supported by the PDI technology, users can collaboratively identify and extract patterns from their data. The PDIs essentially act like a magic camera in regards to data. Instead of static depictions of information, data is shown dynamically, like in a movie. Data becomes animated.

It is essential here to note the high performance of this analytical tool. Firstly, OLAP-style queries are intuitive for business users who are accustomed to business analysis methods. Secondly, the speed at which analyses can be performed plays a major role in the Dynamic Data Discovery process. Every new query is answered in seconds. Thirdly, Panoratio's technology eliminated the need for OLAP modeling, which it performs automatically based on its patented algorithms. These performance hallmarks enable complete user buy-in to the solution, as can be seen in numerous customer examples.

2.3 Dynamic Decision Driving

This segment of the Panoratio Information Discovery describes the feeding back of analysis results into the business processes themselves to enable proactive guidance and

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management of those processes. This is where the business rules are derived that can assist with process management across various business processes. This turns information into action, and represents a clear value-add through Business Intelligence, which has traditionally rarely been the case.

Performance Management is often understood as a top-down approach. Process experts, however, know the indicators and KPIs they need to measure and track in order to manage their process effectively. Here, the PDI technology enables a complementary bottom-up approach as well. KPIs as well as connected, relevant metrics can be identified and extracted via the PDI's pattern recognition capabilities. Through the analysis of process data, this allows for the identification of relevant process parameters. This serves as a major contribution to a company's efforts around continuous improvement.

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2.4 Panoratio Information Discovery in Practice: Case Studies

PANORATIO

Customer Story

Company
- Leading US Multi-Channel Retailer
- Marketing

Business Case
- Enable Marketing Department with the ability to perform ad-hoc analysis & segmentation for campaigns.
- Reduce IT burden/achieve faster results from a time-consuming analytical process

Challenges
- **360-degree analysis** of CRM, Marketing Campaign & Web Analytics data—**QUICKLY**
- Performing **ad-hoc analysis** & **segmentation**
- Optimizing **personalization** & reducing fatigue
- Insight into campaign responsiveness

Solution
- Enabling ad-hoc segmentation across multiple data sources through joining of PDIs
- Daily PDI generation, analysis by multiple people within Marketing Department
- Fusing and analyzing in-store & online customer data

Results
- Faster discovery and integration of analytical findings into marketing programs
- Granular segmentation/Improved personalization
- Revenue increase driven by improved target marketing

Customer Statement

*"We can leverage Panoratio to **better understand our customers**, and deliver a more personalized shopping experience"*

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PANORATIO

Customer Story

Company
Alta Bates Medical Group
Health Care
Integrated Delivery Networks

Business Case
- Analysis Quality Improvement and Cost Reduction of the Services
- Define Targeted Efficiency Measures

Challenges
- Complex hierarchical data
- Cross-sectional analysis (360° view)
- High Data Volume

Solution
- Cross sectional PDI analysis allowing for integration of various data source (Patient Life Management)

Results
- Dynamic Information Provisioning -> Holistic view on different data sources
- Dynamic Data Discovery -> Fast, result driven analysis delivering results for immediate intervention
- Dynamic Decision Driving -> Improvement of Efficiency through benchmarking and best case analysis

Customer Statement:

"Using Panoratio we expect to manage our medical and health care services to optimize the customer experience, deriving entry points for targeted intervention from our own data."

Jim Slaggert, CEO, Alta Bates Medical Group

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PANORATIO

Customer Story

Company
AVIS
Rental Cars

Business Case
- Business Process Optimization
  - Quality Improvement and Customer Satisfaction (Targeted Customer Approach)
- Yield Management

Challenges
- Correlation identification
- Large number of dimensions
- Large amount of data

Solution
- Deep view data analysis combining quantitative numbers with qualitative attributes from customer preferences

Results
- Dynamic Data Discovery -> Fast, result driven analysis delivering results for immediate intervention
- Dynamic Decision Driving -> Business process optimization for external product provision and internal organizational structure

Customer Statement:

"Customer satisfaction is of paramount importance to AVIS. Based on our unique data and customers, Panoratio allows us to support our goal to provide the desired car with lowest possible waiting times at any place and any time of year."
Frank Lüders, EO, Avis Germany

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PANORATIO

Customer Story

Company
- Leading US Community Portal & Search Engine
- Project is co-owned between Online Marketing & Analytics Departments

Business Case
- Ad-hoc analysis for online marketing campaigns
- Reduce IT burden/achieve faster results from a historically cumbersome and time-consuming analytical process

Challenges
- Analysis of online marketing data **QUICKLY**
- Banner/Ad Campaign **optimization** & **personalization**
- Performing **ad-hoc analysis** & **segmentation**

Solution
- Delivering granular insight into leading banner ad revenue generators
- Enabling ad-hoc segmentation for increased/improved customization & personalization

Results
- Faster discovery and integration of analytical findings into marketing programs
- Revenue increase driven by improved target marketing

Customer Statement

"Using Panoratio, I can **accomplish in hours** with Panoratio, what takes me days and weeks using just SAS."

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3 Panoratio – Concept and Method

3.1 Pattern recognition, PDIs and neural networks

Our sensory organs provide us with a constant stream of information regarding our environment. The amount of data we are constantly processing is significant. Our optical nerves alone transport several gigabytes worth of data from eye to brain. In fractions of a second, this data stream is reduced to its essence, extracting only relevant information. The external world is now a more efficient, internal depiction, which is also referred to as a neural code. In this form, new impressions formed of the surrounding environment are compared to a large number of previously stored experiences, leading to conclusions we act upon.

How does our brain solve this puzzle? To a great extent, this is still a mystery, but some aspects have been decoded. One element that plays a critical role in this process of information compression, processing conclusion is that of pattern recognition. This seems to be relevant at all levels of information processing. The early stages of information processing are enabled through, among others, the first layers of the visual cortex (the segment of the cerebral cortex that's part of the visual system and enables visual cognition), which extract edges as important image-coding elements. Patterns play an equally important role within the higher levels of information processing. It is well known, for example, that even at very abstract levels, people still like to think in terms of (more or less sophisticated) 'buckets', i.e. typical patterns and categories, and base their conclusions upon them.

It should be noted that these patterns necessary for coding do not exist *a priori*, but are developed only through the stream of information we derive form the environment around us. This process is also referred to as 'self-organized learning'. Typical patterns from our environment are initially imprinted into our brains via the processing of information – corresponding environmental stimuli resonate with these imprinted patterns and can therefore be processed more quickly, while unrecognizable stimuli don't cause the same reaction. This is the only way individuals can efficiently adjust their data processing to the respective environment around them.

At first glance, the development of neural networks might not seem relevant to BI and data, but several aspects of neural information processing are mirrored within Panoratio's PDI technology. Originally very large amounts of data are transformed into a compact, 'internal' format. Compression, however, is only part of it – PDIs not only distinguish themselves by their compression capabilities, but also through the ability of users to access and analyze that data very quickly. In reality, a PDI can realize an extremely rapid index within the compressed data, with the potential for 1000 dimensions or more.

As with neural information processing, pattern recognition plays a decisive role in the construction of a PDI. The patterns found in the data are used to efficiently encode the data's typical structures. In doing so, data are coded as reference points for certain patterns by using statistical models. Any data that can be inferred from a pattern or can be statistically

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predicted no longer needs to be encoded explicitly. Only the statistically ‚unexpected' characteristics of a variable, i.e. the deviance from typical patterns – are encoded.

From another perspective, this completely new ‚Business Intelligence' technology can be related to the field of artificial intelligence. Just as the human brain translates sensory inputs based on patterns into a more compact and efficient 'internal depiction', PDIs work with significantly more efficiently structured data. Similarly to the brain, which is highly associative, one of the PDI technology's strengths is its ability to show the dependencies between myriad dimensions. This technology can be described as a bridge between today's database technologies and procedures within the fields of artificial intelligence and machine learning.

3.2 Panoratio – Unique Differentiating Points

The strength of Panoratio's offering truly comes into play in scenarios where

- Many datasets are available (length of a table). The larger the amount of data is, the more patterns can be recognized, since patterns can only be identified through the *repetition* of comparable structures.
- Many dimensions are available (width of a table). Data patterns aren't defined only through single dimensions, but rather through the overall picture of many variables. The more variables are known, the more precise this overall picture can be.

Based on the above, the PDIs strengths are most useful when dependencies and correlations between many dimensions can be examined and depicted. The ability to show the dependencies between many variables also means the capacity to draw conclusions about unknown variables and create associations. These capabilities are typical hallmarks of an intelligent system.

The following table compares the cranial behavior of higher vertebrates to that of Panoratio's PDIs as well as traditional Business Intelligence technologies.

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	Brain of higher vertebrates	PDI	Business Intelligence Technologies
Compression of large data volumes with simultaneous rapid access	Highly redundant sensory information is efficiently encoded – rapid access is crucial to the survival of the individual	Compression of large data volumes with simultaneous rapid access are key features of the PDI format	**Relational DBs**: No compression, delayed access, **Multidimensional DBs**: fast access to limited number of variables, slow, with possible 'data explosion' around many dimensions
Number of dimensions / processed input variables	Unknown (> 10^6)	1000 and above	Cube: ~ 20 dimensions, relational DB: only a few indices of a table
Relational analysis	(difficult to compare, but different ‚modules' within the brain are tightly connected)	Yes – different PDIs can be fused together	No – fusions only within relational DBs, which however aren't designed to support rapid analyses
Pattern recognition	Yes	Yes	No
Ability to associate / drawing conclusions based on depiction of context in many dimensions	Yes	Yes	No
Processing paradigms	Self-organizing, distributed information processing, highly parallel-oriented	Parallel shared memory architecture, distributed peer-to-peer possible	Distributed OLAP unknown

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Conclusion: Based on patented technologies, Panoratio delivers tools for the interactive analysis and visualization of large amounts of data, especially for companies in which:

- Process orientation plays a key strategic and operational role and where processes need to be agile and industrialize.
- Real-time concepts play a major role, and time plays a critical role in operational processes.
- Business and executive users need to make better decisions based on facts and should do so mostly independent of IT.
- The extreme pressure of current market dynamics within the so-called transitional markets needs to be counteracted.

In these scenarios, Panoratio's main advantages are

- PDIs are mathematics-based, innovative tools for the interactive visualization of data for multidimensoinal data exploration. They automate OLAP modelling through a data-based approach.
- PDIs enable high-performance interactive data visualization with which both business and executive users can gain insight into the performance of their comapny, especially in time-critical situations.
- Analyses are similar to the style of OLAP. Since the OLAP modeling is automated, the implementation of Panoratio's technology is transparent and quick – it immediately proves the expected return-on-investment.
- Users do not require special IT skills to use PDIs. PDIs are self-learning.

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PANORATIO®

About Panoratio

Panoratio delivers an in-memory Platform for Analytical Performance Management—which enables real-time 360º customer-centric analysis. Within the PANOsight™ platform, the source data is transparently compressed up to 1:100% of the original size without loss of information or detail. As such the platform is ideally suited for archiving, distribution and syndication of large amounts of data. With PANOsight, companies can fuse all their data silos (Brick, Marketing, Web Analytics, Demographic, etc), to realize a complete customer view across all major touch-points; and can discover interrelationships and patterns that have previously remained “hidden”. All queries return in fractions of seconds, and complete analysis can occur in a fraction of the historical time. With Panoratio, there is practically no limit to the complexity of the data which can be analyzed.

Panoratio has over 50 customers in production, including Macy’s, Yahoo!, AVIS, Vodafone and AOL Deutschland, and is an IBM® Advanced Partner.

Please visit www.panoratio.com to learn more.

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The Author

Dr. Wolfgang Martin

Dr. Wolfgang Martin is a European expert in the fields of

- BI/CPM (Business Intelligence/Corporate Performance Management)
- Business Integration (Business Process Management, Enterprise Information Management)
- SOA (Service Oriented Architecture)
- CRM (Customer Relationship Management)

His specializes in the technological innovations that drive business, and examining their impact on organization, enterprise culture, business architecture and business processes. He is a founding partner of iBonD Ltd (www.iBonD.net), Ventana Research Advisor (www.ventanaresearch.com), Research Advisor at the Institute for Business Intelligence at the Steinbeis University, Berlin (www.i-bi.de) and a member of the CRM Expert Panel (http://www.crm-expert-site.de/expertenrat/main_expertenrat.cfm?site=rat

Dr. Martin is an independent analyst. After 5½ years with META Group, latterly as Senior Vice President International *Application Delivery Strategies,* Dr. Martin established the **Wolfgang Martin Team.** His analytic skills are sought by many of Europe's leading companies in consulting engagements. A frequent contributor of articles for IT journals and trade papers, he is also an editor of technical literature, such as the Strategic Bulletins on BI, CRM, SOA and EAI (www.it-research.net), as well as *"Data Warehousing – Data Mining – OLAP" (Bonn, 1998)*, and *"Jahresgutachten CRM", (Würzburg, 2002, 2003, 2004, 2005 & 2007).*

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