Regulation, increased product complexity and the growth of algorithmic trading have all increased the need for trading and risk management systems among banks. In this environment, Murex has topped Risk's *technology survey for the third year, but with Algorithmics and Savvysoft breathing down its neck, competition is fiercer than ever. By* **Clive Davidson**, *with research by* **Xiao-Long Chen**

Murex marches on

Murex continues to demonstrate its strength in derivatives trading and risk management in *Risk*'s 2007 technology rankings, taking top spot overall for the third year running. Despite its single-minded focus, the company is rapidly evolving towards becoming an industrial-size software supplier like Misys, Reuters and SunGard, all of which provide a far broader range of financial applications and services, but which finished below it in this year's rankings.

In the risk management systems sector, Algorithmics held its dominant position across market, credit and operational risk, as well as collateral management and Basel II. But competitive pressure is fierce – particularly in operational risk, where rankings newcomer Chase Cooper scored a coup by winning the internal loss database category and sharing honours with Algorithmics in the assessment and key risk indicators category.

Overall, there was little change in the top six rankings from last year (*Risk* December 2006, pages 70–80)[1], although New York-based analytics vendor Savvysoft leapfrogged Pennsylvania-based risk management systems giant SunGard to take third place in this year's poll. There was considerable movement further down, however, with Savvysoft rival NumeriX shooting up the rankings from thirteenth to seventh place. A number of new names also joined the leaderboard, including London-based Chase Cooper, San Francisco-based credit risk technology vendor Moody's KMV, Atlanta-based asset and liability systems vendor IPS-Sendero,

and New York and London-based data and analytics vendors Bloomberg and Markit all appearing for the first time.

Of the new categories introduced this year, Bloomberg won data vendor, SunGard took asset and liability management (ALM) system and London-based Misys won Internal Accounting Standard (IAS) 39 system vendor.

At the top of the table, Murex won five first places, 10 second positions and two third places, down slightly on last year (seven first places, 11 second places and five third places). The Paris-based company provides a cross-asset front- to back-office system, and now has installations of considerable scale in major institutions across the globe, including India's ICICI Bank, US life insurer MetLife and Spain's Grupo Santander. These institutions point to the strength of Murex's product offerings and its partnership approach in working with banks as being particularly strong.

"We evaluated Murex and found the system significantly superior to competitor products in meeting our requirements with respect to product coverage and pricing, with the advantage of being a single integrated system covering all aspects of a transaction," explains Amit Sethi, joint general manager of the technology group at ICICI Bank. The bank has already implemented the system for interest rate, foreign exchange and fixed-income derivatives and credit default swaps, and is introducing it for cash forex, equities and other credit derivatives. "The Murex system has helped us build our treasury

business almost twofold in the past 12 months," adds Sethi.

MetLife implemented the Murex system in 2002 for full front- to back-office support of all derivatives. It chose the system because of the breadth of its functionality and product coverage, and the strength of its credit derivatives module, says Mark Ronan, vice-president, applications development at MetLife, who was involved in the selection process. "At the same time, we felt Murex was the strongest vendor in terms of support for credit derivatives," he adds. Murex is currently working with the company to improve its support for hedge accounting and compliance with US Financial Accounting Standard (FAS) 133. "We've worked closely with Murex on developing this functionality, and they have put a lot of effort into helping us and improving the product," adds Ronan.

Meanwhile, Grupo Santander has implemented the Murex system for its global interest rate, foreign exchange, equities, commodities and credit derivatives businesses across the front and middle office, and extended it for cash products in Latin America. "Santander has a policy of working with vendors that can offer continuous system enhancements generated by their clients' needs," says Luis Santos, head of IT global services, Santander Global Banking and Markets. "We try to get as much as possible from the inputs that a big vendor like Murex gets from its various clients. If a vendor is able to create partnerships

[1] *www.risk.net/public/showPage.html?page=356553*

with big players who are at the leading edge in certain business lines, then you tend to catch up more quickly than if you were trying to do the system development yourself from scratch. Murex is willing to create partnerships with its clients to address specific opportunities."

Algorithmics also racked up five first-place wins in this year's rankings – the same as Murex. However, the Toronto-based firm scored two second places and three third places, putting it in second place overall. Michael Zerbs, president and chief operating officer of Algorithmics, says banks are increasingly looking to take an integrated approach to market, credit and operational risk, particularly since the recent turmoil in the credit markets – and this is something that plays to the company's strengths. "The problems of the financial industry in the subprime sector in August and September were reported as a credit risk problem. But when you look at the aggressive lending practices some institutions had, you can make a strong argument that it was as much an operational risk problem leading to a liquidity risk problem where people could not price or sell assets or needed alternative funding very quickly," he says.

Algorithmics now has research projects looking at the frequency of operational risk incidents during market and credit crises, and the degree to which operational, market and credit events correlate. "I see the classic risk categories – market, credit, operational and liquidity risk – increasingly blending together. It is becoming harder to classify not just an event, but even a risk measure as one or the other. For example, credit risk is increasingly priced, traded and transferred as if it were market risk," says Zerbs, pointing to the emergence of contingent credit default swaps – similar to traditional credit default swaps, but where the payout in the event of default is referenced to the mark-to-market of another derivatives transaction such as an interest rate swap.

However, Algorithmics is under pressure from several competitors. Chase Cooper, for example, is emerging as a strong contender to Algorithmics in operational risk management. The company's aCCelerate system, which is now used by more than 20 major organisations globally, can model risk and control data, giving clients the ability to explore precise scenarios – for instance, what would be the impact on a firm's profit and loss if the severity or frequency of a specific risk increased by 15%, while the effectiveness of a control decreased by 10%? Now, institutions can have the kind of analytical tools for operational risk that they have had for market and credit risk for some time, remarks John Kiddy, chief executive of Chase Cooper: "Operational risk is becoming less about just scoring risks and controls and reporting them to the board, and more about informing them what would happen if risks changed, and what the organisation's sensitivity to change is."

Meanwhile, pricing and analytics remains a highly competitive field – as reflected in this year's rankings. Murex holds its top spot in commodities analytics, while Paris-based Sophis toppled New York-based Imagine from top spot in equities analytics. However, analytics specialists took the top slots in all the other analytics categories, with London-based SuperDerivatives number one in foreign exchange, New York-based NumeriX top in structured products, and New York-based Savvysoft winning the cross-asset, credit and rates categories.

Add Savvysoft's third place in market risk to its analytics results, and its performance in the rankings is a remarkable achievement for this relatively small software house. The company continues to innovate, introducing a new Libor

market model in October, which uses multi-factor recombining trees to achieve speeds up to 50 times faster than the usual Monte Carlo simulation approach, claims Savvysoft's president, Rich Tanenbaum. The vendor is also working on a model for illiquid mortgage-backed securities (MBSs). Accounting regulations FAS 157 (fair value measurements) and FAS 159 (the fair value option for financial assets and financial liabilities) mean organisations have to calculate the fair value of the instruments they hold, including MBSs, but they cannot use the conventional method of valuing the instruments in pools. Savvysoft is using its knowledge of mortgages, credit derivatives and exotic interest rate derivatives to model the individual loans, says Tanenbaum.

Savvysoft users say the company scores highly on the flexibility of its software. Francisco Aleman, executive vice-president of derivatives and secondary marketing accounting at California-based real estate finance specialist Countrywide Financial, says: "Given the complexity of our business, the flexibility of the Savvysoft product is critical to my needs. For example, I can compute a delta for instruments with optionality, such as range floaters and cancellable swaps, which then allows me to determine an expected life that I then use to amortise underwriting and other costs. Since the expected life can change from period to period depending on volatility and interest rates, I can retrospectively compute the appropriate amortised costs."

But it is clear Savvysoft gets its edge in the quality of the support it offers. Aleman says the company offers "phenomenal customer service". Tim McNamara, FAS 133 accounting specialist at Virginia-based electricity generator AES, who uses the

Survey respondents by location (%)
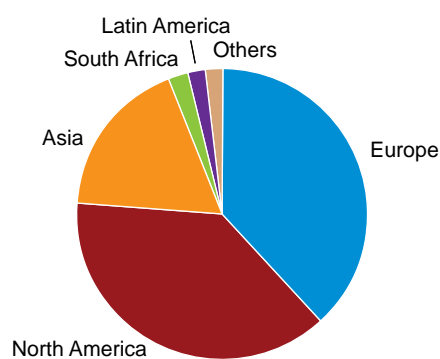
Survey respondents by type of institution (%)
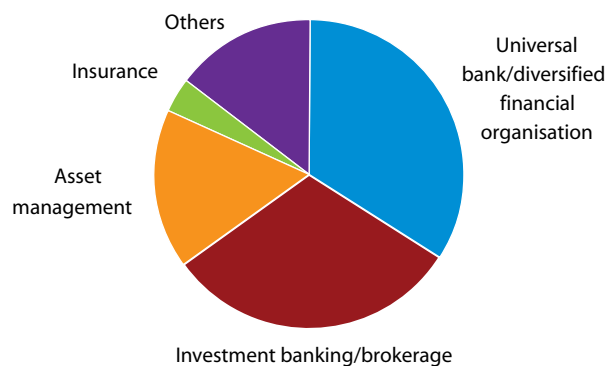
company's analytics for valuation of its forex and interest rate hedges, agrees: "The number-one reason to my mind why Savvysoft scores so highly is due to their great support."

Savvysoft rival NumeriX was placed in the top five in all analytics categories except equities, winning a number one slot in structured products. The company has a very different business model from Savvysoft, deciding in 2004 to take an 'Intel inside' strategy to delivering its technology by enabling trading and risk management technology vendors to embed its analytics in their systems. NumeriX now has 41 partnerships with trading and risk management system vendors, including Algorithmics, San Francisco-based Calypso Technology, Murex and London-based Reuters, and recently signed a deal with Bloomberg to embed NumeriX analytics in calculators in its Bloomberg Professional data and analytics service. NumeriX president and chief operating officer Steven O'Hanlon says these partnership arrangements, from which the company now generates 40% of its revenues, benefit both parties: "The ability to attract and retain the type of quantitative people to build these exotic analytics is very challenging, so vendors rely on us for the high-end analytics and do the vanilla models themselves." NumeriX now employs 41 PhDs out of a total staff of 110.

Fourth place in the rankings overall went to SunGard, which topped the credit risk limits checking and the ALM system categories, took second places in credit risk trading and banking and Basel II, and seven third places across a range of categories, including operational risk. SunGard has now rebranded the Sword operational risk management application from Dublin-based Ci3 under its BancWare banner. (If *Risk* conducted its rankings by product rather than by vendor, then the combined score of Ci3 and SunGard would have taken Sword to the top in the operational risk assessment and

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Steven O'Hanlon, NumeriX

key risk indicators and internal loss database categories.)

Like its rivals Misys and Reuters, SunGard has a broad range of financial technology and global operations. Its Adaptiv 360 risk management system and BancWare ALM applications have strong international client bases, particularly among second- and third-tier institutions. Recent client wins include: United Arab Emirates-based First Gulf Bank, which uses BancWare for regulatory capital calculation and reporting requirements, and has implemented Adaptiv for market risk management of off-balance-sheet issues; Cincinnati-based Fifth Third Bancorp, which uses Adaptiv 360 for market and credit risk management; and Minneapolis-based securities firm Piper Jaffray & Co, which has implemented Adaptiv 360 for market risk.

London-based Misys finished fifth overall, with wins in the rates trading system and IAS 39 categories and top-five placings in almost all sections of the rankings, including market, credit and operational risk. The company was one of the first technology vendors to provide specific support for structured products with the Must module for its Summit trading and risk system, and this has been instrumental in winning deals. It recently won new clients in emerging markets, with sales to Kazkommertsbank, the largest bank in Kazakhstan, and Gnupur, an Iceland-based investment company.

With companies such as Calypso (which matched its sixth position of last year) building on its strength in credit derivatives, Sophis (which finished joint eighth, one place up on last year) maintaining its leading position in equities and structured products, and Reuters (joint eighth this year, versus joint eleventh in 2006) continuing to evolve its trading and risk management suite of applications, and with new entrants such as Chase Cooper, Markit and Bloomberg making their mark in this year's poll for the first time, it is clear that the derivatives trading and risk management technology sector will remain highly dynamic and competitive. There is no room for Murex to rest on its laurels. ●

RISK TECHNOLOGY RANKINGS 2007

OVERALL

Rank	Vendors	1st places	2nd places	3rd places
1	Murex	5	10	2
2	Algorithmics	5	2	3
3	Savvysoft	3	2	1
4	SunGard	2	2	7
5	Misys	2		3
6	Calypso	1	3	4
7	Chase Cooper	1	2	
8=	Reuters	1	1	1
8=	Sophis	1	1	1
10=	Fermat	1	1	
10=	Imagine	1	1	
10=	Moody's KMV	1	1	
13	NumeriX	1		2
14=	Bloomberg	1		
14=	SuperDerivatives	1		
16=	IPS-Sendero		1	
16=	SAS		1	
18=	Ci3			1
18=	Markit			1

MARKET RISK MANAGEMENT

38 companies cited

2007	2006	Company	%
1	3	Murex	12.8
2	1	Algorithmics	12.3
3	4	Savvysoft	10.1
4	10	Reuters	9.0
5	7=	Calypso	7.3
6	2	SunGard	6.5
7	5	Misys	5.7
8		NumeriX	5.0
9	6	Imagine	4.2
10	7=	Sophis	3.7

CREDIT RISK MANAGEMENT

Trading and banking

35 companies cited

2007	2006	Company	%
1	3	Moody's KMV	12.7
2	1	SunGard	12.3
3	2	Algorithmics	9.3
4	4	Misys	8.8
5		Reuters	8.5

Limit checking

30 companies cited

2007	2006	Company	%
1	1	SunGard	14.7
2	3	Murex	13.7
3	2	Algorithmics	13.4
4		Reuters	10.5
5	4	Calypso	9.6

CAPITAL RISK CALCULATION

Regulatory

29 companies cited

2007	2006	Company	%
1=	1	Algorithmics	11.1
1=	3	Fermat	11.1
3	2	SunGard	10.9
4		Reuters	9.8
5	5	Misys	7.5

Economic

26 companies cited

2007	2006	Company	%
1	1	Algorithmics	11.9
2	4	Moody's KMV	10.2
3	2	SunGard	9.9
4	3	Fermat	8.9
5		Misys	7.8

OPERATIONAL RISK MANAGEMENT

Assessment and key risk indicators

30 companies cited

2007	2006	Company	%
1	1	Algorithmics	11.8
2		Chase Cooper	9.5
3	2	SunGard	8.9
4	4	SAS	8.3
5	3	Ci3	8.1

Internal loss database

27 companies cited

2007	2006	Company	%
1		Chase Cooper	10.4
2	2	Algorithmics	10.2
3	1	Ci3	9.8
4	4	SunGard	9.5
5	3	SAS	8.3

OPERATIONAL RISK

Capital calculation
29 companies

2007	2006	Company	%
1	1	Algorithmics	10.2
2=	2	SAS	9.5
2=		Chase Cooper	9.5
4	3	SunGard	7.4
5	5	Misys	7.1

TRADING SYSTEMS

Commodities
24 companies cited

2007	2006	Company	%
1	1	Murex	18.2
2		Calypso	15.8
3	2	SunGard	10.0
4	3	OpenLink	9.1
5	4	Sophis	7.7

FX
30 companies cited

2007	2006	Company	%
1	1	Reuters	16.1
2	2	Murex	15.9
3	5	Misys	12.2
4	4	SunGard	10.7
5	3	Wall Street Systems	5.5

Credit
25 companies cited

2007	2006	Company	%
1	1	Calypso	17.6
2	2	Murex	15.6
3	4	Misys	12.3
4	3	SunGard	9.6
5		Reuters	7.2

Rates
28 companies cited

2007	2006	Company	%
1	1	Misys	18.8
2	2	Murex	17.6
3	3	Calypso	16.5
4	4	SunGard	7.4
5		Bloomberg	5.6

Cross-asset
26 companies cited

2007	2006	Company	%
1	1	Murex	16.5
2	3	Calypso	14.2
3		Reuters	10.7
4	4	Misys	9.1
5	2	SunGard	7.8

Structured products
25 companies cited

2007	2006	Company	%
1	2	Murex	17.4
2	4	Calypso	14.9
3	1	SunGard	9.8
4	3	Misys	8.3
5	5	Sophis	8.1

Equity
27 companies cited

2007	2006	Company	%
1	1	Imagine	13.5
2	3	Sophis	13.2
3	2	Murex	11.0
4		Calypso	10.5
5		Reuters	9.6

ANALYTICS

Commodities
26 companies cited

2007	2006	Company	%
1	1	Murex	15.2
2	2	Savvysoft	13.1
3		Sophis	12.0
4		NumeriX	9.4
5	4	SuperDerivatives	8.2

Credit
24 companies cited

2007	2006	Company	%
1	4	Savvysoft	16.3
2	2	Murex	16.1
3	5	Calypso	13.4
4	3	NumeriX	10.8
5	1	SunGard	8.2

ANALYTICS

Cross-asset
26 companies cited

2007	2006	Company	%
1	1	Savvysoft	18.6
2	3	Murex	15.2
3		Calypso	13.4
4	2	NumeriX	10.2
5		Reuters	7.4

Rates
24 companies cited

2007	2006	Company	%
1	1	Savvysoft	18.5
2	3	Murex	15.6
3	2	NumeriX	11.7
4	5	Calypso	10.4
5		Reuters	6.7

Equities
23 companies cited

2007	2006	Company	%
1	4	Sophis	14.4
2	1	Imagine	14.2
3	2	SunGard	12.8
4		Murex	10.6
5		Savvysoft	8.1

Structured products
25 companies cited

2007	2006	Company	%
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2	1	Savvysoft	15.7
3	2	Murex	11.3
4		Calypso	10.5
5	5	Misys	7.6

FX
25 companies cited

2007	2006	Company	%
1	1	SuperDerivatives	16.2
2	2	Murex	15.2
3	3	NumeriX	13.7
4	5	Savvysoft	12.1
5	4	SunGard	8.5

Data vendor
23 companies cited

2007	2006	Company	%
1	na	Bloomberg	19.3
2		Reuters	17.6
3		Markit	11.5
4		LIM	9.4
5=		Interactive Data	7.4
5=		Quant House	7.4

Collateral management
23 companies cited

2007	2006	Company	%
1	1	Algorithmics	18.6
2	3	Murex	17.3
3	2	SunGard	15.3
4		Calypso	10.4
5	4	Misys	8.5

Asset and liability management
23 companies cited

2007	2006	Company	%
1	na	SunGard	12.1
2		IPS-Sendero	9.2
3		Misys	8.7
4		Fermat	8.6
5		Quantitative Risk Management	8.3

Basel II
21 companies cited

2007	2006	Company	%
1	1	Fermat	17.6
2	3	SunGard	15.8
3	2	Algorithmics	13.4
4	4	Misys	10.2
5	5	SAS	8.8

IAS 39
24 companies cited

2007	2006	Company	%
1	na	Misys	11.7
2		Murex	10.8
3		Calypso	10.3
4		Reuters	8.9
5		SunGard	7.5