

Magic Quadrant for Fiber-to-the-Home Equipment

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This Magic Quadrant analyzes the position of 18 technology providers in a relatively immature market that is ripe for consolidation. The market leaders are Alcatel-Lucent, Cisco, Ericsson, Mitsubishi, Motorola and Sumitomo.

WHAT YOU NEED TO KNOW

The fiber-to-the-home (FTTH) market is still in its infancy, but the nature of the market is such that it will play out as a cost-sensitive high-volume market, similar to, for example, the DSL market. As was the case in the DSL market, it is expected that the number of technology providers in the market will be reduced over time.

Different technologies, including broadband passive optical network (BPON), gigabit passive optical network (GPON), Ethernet passive optical network (EPON) and point-to-point (PTP) (aka Active Ethernet) are competing in this market, and network service provider (NSP) technology choices depend mainly on geography, operator type and regulatory context.

As the different technologies have attributes that make them more or less relevant in different contexts, NSPs should be careful to ensure that the solutions from shortlisted suppliers fit both the desired business models and the prevailing regulatory context.

NSPs should take into account the vast commitment related to deploying FTTH infrastructure – in terms of invested capital, time spent and the duration of the project – when shortlisting potential suppliers.

MAGIC QUADRANT

Market Overview

The FTTH market is still in its infancy, although deployments in certain markets have reached significant volume – most noticeable is the Japanese market, where there are now more than 13 million FTTH subscribers (as of the end of June 2008 according to the official numbers from the Japanese Ministry of Internal Affairs and Communications [MIC]), which exceeds the number of DSL subscribers. Verizon's deployments in the U.S. market are also attracting a lot of attention, and its Fiber Optic Service (FIOS) is now (as of the end of September 2008, based on Verizon's FIOS Fact Sheet) offered in 16 U.S. states, marketed to more than 9 million residential homes and has more than 2 million subscribers. Deployments in Europe are also picking up in various countries, most notably in France, Sweden, the Netherlands, Denmark and Portugal.

The growth in the FTTH market is evident from our latest market forecasts: The worldwide market for residential FTTx equipment will grow from \$3.2 billion in 2008 to \$5.5 billion in 2012. In contrast, the worldwide market for xDSL equipment will decline from \$7.3 billion in 2008 to \$5.8 billion in 2012. These numbers reflect a technology migration from DSL toward

FTTH, a scenario that has already unfolded in Japan as described above. In reality, the technology migration is quite complex as other broadband technologies – such as Data-Over-Cable Service Interface Specification (DOCSIS 3.0) over hybrid fiber coaxial cable/DOCSIS passive optical network (PON) and RF over Glass (RfG), WiMAX and mobile broadband solutions – each play their role and affect how the migration happens. It should also be noticed that FTTH by nature is a strategic long-term and capex-intensive investment, and therefore is relatively sensitive to the ongoing financial crises – this attribute of FTTH investments has been factored into our forecasts.

The technologies used when deploying FTTH networks vary between different regions and between the different types of NSPs. Generally speaking, PON technologies (EPON and GPON) tend to be favored by incumbent carriers, where PTP has its sweetspot among alternative carriers, municipalities and utilities. There is also a regional angle, as EPON is mainly deployed in Asia/Pacific, as well as a regulatory angle, as the choice between PON and PTP solutions affects carriers' abilities to support the business model known as "open access," which allows multiple NSPs to coexist on the same fiber infrastructure.

In the analysis behind the FTTH Magic Quadrant, EPON, GPON and PTP are considered the mainstream FTTH technologies. BPON is considered a legacy technology at this point, and 10-Gigabit PON and wavelength division multiplexing (WDM) PON are considered options for the future rather than mainstream technologies in the current market. The focus of the analysis has been the mainstream technologies, although legacy and future technology aspects have been taken into account where appropriate.

As was the case with the DSL market, the evolution of the FTTH market will follow a high-volume, low-cost scenario. However, the fact that expensive fiber deployments are a prerequisite for FTTH (in contrast to the reuse of existing copper for DSL) means that both the time scale and outcome may vary compared to what has happened in the DSL market: the time scale is bound to be longer given the size and scale of the investments, and differences in regulatory frameworks and NSP choice of business models may allow for more than one technology to prosper in the market. Despite these considerations, the market is bound to consolidate over time as the full impact of the high-volume, low-cost nature of the market unfolds.

Figure 1. Magic Quadrant for Fiber-to-the-Home Equipment



NSPs should take the vast commitment related to deploying FTTH infrastructure – in terms of invested capital, time spent and the duration of the project – into account when shortlisting potential suppliers. As the different technologies have attributes that makes them more or less relevant in different contexts, NSPs should be careful to ensure that the solutions from shortlisted suppliers fit the desired business models as well as the prevailing regulatory context.

Market Definition/Description

The market covered by this Magic Quadrant is defined as "FTTH equipment used by NSPs to provide broadband access services."

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FTTH equipment should here be understood as equipment used in fiber access deployments where fibers extend all the way to the end-user premises and the equipment is designed and optimized for use in residential applications.

Inclusion and Exclusion Criteria

To qualify for the FTTH Magic Quadrant, a technology provider must satisfy one of the following two criteria:

- **Criterion A – Market Share:** The technology provider must have achieved at least 2% market share in 2007 – as per Gartner’s “Market Share: FTTx Access Equipment, Worldwide, 2007”.
- **Criterion B – Mind Share:** The technology provider must have achieved significant mind share in the FTTH segment either through its installed base, its presence in neighboring access segments (mainly DSLAM) or through its visibility in terms of publicly announced FTTH contracts.

Added

Not applicable

Dropped

Not applicable

Evaluation Criteria

Ability to Execute

Gartner analysts evaluate technology providers on the quality and efficacy of the processes, systems, methods or procedures that enable IT provider performance to be competitive, efficient and effective, and to positively impact revenue, retention and reputation. Ultimately, technology providers are judged on their ability and success in capitalizing on their vision.

The technology providers’ positions on the Ability to Execute have been determined by evaluating them against the following criteria:

- **Product/Service:** Core goods and services offered by the technology provider that compete in/serve the defined market. This includes current product/service capabilities, quality, feature sets and skills, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria. Both PTP and PON equipment are included, and professional service offers including system integration skills specifically related to FTTH are also considered. Advantages gained in the FTTH market through capabilities within important neighboring segments are also taken into account.
- **Overall Viability (Business Unit, Financial, Strategy, Organization):** Overall viability includes an assessment of the overall organization’s financial health, the financial and practical success of the business unit and the likelihood of the individual business unit to continue to invest in the product, continue offering the product and advancing the state of the art within the organization’s portfolio of products. The volume aspect of the access market and derived challenges for FTTH technology providers are included in this part of the evaluation, where a technology providers’ market share and number of enabled subscribers across the customer base are key indicators.
- **Market Responsiveness and Track Record:** Ability to respond, change direction, be flexible and achieve competitive

success as opportunities develop, competitors act, customer needs evolve, and market dynamics change. This criterion also considers the provider’s history of responsiveness. Ability to adapt and scale activities in individual markets and work with own partners as well as crucial third parties such as regulators, municipalities and civil work contractors – to “cast a wide net” and still be able to execute and scale fast when opportunities turn into actual contracts.

- **Marketing Execution:** The clarity, quality, creativity and efficacy of programs designed to deliver the organization’s message in order to influence the market, promote the brand and business, increase awareness of the products and establish a positive identification with the product/brand and organization in the minds of buyers. This “mind share” can be driven by a combination of publicity, promotion, thought leadership, word-of-mouth and sales activities. Ability to market offered solutions under different regulatory contexts and adapt to different carrier FTTH business models.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product/Service	high
Overall Viability (Business Unit, Financial, Strategy, Organization)	high
Sales Execution/Pricing	no rating
Market Responsiveness and Track Record	standard
Marketing Execution	standard
Customer Experience	no rating
Operations	no rating
Source: Gartner	

Completeness of Vision

Gartner analysts evaluate technology providers on their ability to convincingly articulate logical statements about current and future market direction, innovation, customer needs, and competitive forces and how well they map to the Gartner position. Ultimately, technology providers are rated on their understanding of how market forces can be exploited to create opportunity for the provider.

The technology providers’ positions on the Completeness of Vision have been determined by evaluating them against the following criteria:

- **Market Understanding:** Ability of the technology provider to understand buyers’ needs and translate these needs into products and services. Vendors that show the highest degree of vision listen and understand buyers’ wants and needs, and can shape or enhance those wants with their added vision. The

ability to see FTTH in the wider context of carriers' overall network transformation strategies is of particular importance, provided that this insight is reflected directly in the product road map of the technology provider.

- **Marketing Strategy:** A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the Web site, advertising, customer programs and positioning statements. Alignment of the technology providers' FTTH marketing strategy with its current market position and its overall FTTH portfolio strategy, including a regional focus.
- **Offering (Product) Strategy:** A technology provider's approach to product development and delivery that emphasizes differentiation, functionality, methodology, and feature set as they map to current and future requirements. This includes differentiated approaches to the different FTTH segments, including traditional carriers, municipalities and utilities.
- **Business Model:** The soundness and logic of a technology provider's underlying business proposition. To what extent is the long-term and capex-intensive investment nature of carrier's FTTH investments taken into account and leveraged. To what extent does the business model address the revenue challenges that carriers are facing in relation to FTTH deployments.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	standard
Marketing Strategy	standard
Sales Strategy	no rating
Offering (Product) Strategy	high
Business Model	high
Vertical/Industry Strategy	no rating
Innovation	no rating
Geographic Strategy	standard
Source: Gartner	

Leaders

These are high-viability technology providers with a broad portfolio, significant market share, broad geographic coverage, a clear vision for how service provider needs will evolve and a proven track record for delivering products. They are well positioned with their current product portfolio and are likely to continue to deliver leading products. Leaders do not necessarily offer the best solution for every customer requirement, and their products may not be best-of-breed in every area of their portfolio. However, overall, they provide solutions that offer relatively lower risk and higher quality.

Technology providers in this quadrant are Alcatel-Lucent, Cisco, Ericsson, Mitsubishi, Motorola and Sumitomo Electric Networks.

Challengers

These are technology providers with strong market capabilities and good solutions for specific markets, but the products overall lack the breadth and depth of those from Leaders. The solutions do not offer a clear vision of how the market is evolving and are not as innovative or advanced as those of Leaders.

Technology providers in this quadrant are Fujitsu, Huawei and Nokia Siemens Networks.

Visionaries

Visionaries demonstrate a clear understanding of the market and provide key elements of innovation, illustrative of the future of the market. However, they currently lack the ability to influence a large portion of the market, have not yet expanded their sales and support capabilities to a global reach, or do not yet have the funding to execute with the same capabilities as a technology provider in the Leaders quadrant.

Technology providers in this quadrant are Calix, Enablence, Occam and PacketFront.

Niche Players

The technology providers in this quadrant offer products that focus on a segment of the market or a subset of functionality. Customers that are aligned with the focus of a Niche Player can find such providers' offerings to be a good fit.

Technology providers in this quadrant are ECI, Hitachi, Tellabs, UTStarcom and ZTE.

Vendor Strengths and Cautions

Alcatel-Lucent

Geographic Focus: Worldwide. Technology Focus: GPON, but also supporting PTP.

Strengths

- Very strong position in access and neighboring segments (transport, service provider routers, Internet Protocol television [IPTV] and so on).
- Well established in Tier 1 accounts, as well as smaller NSPs including CLECs, utility companies and municipalities.
- Geographically diverse customer base including both GPON and PTP deployments.
- Intelligent Services Access Manager (ISAM) IP access platform, supporting multiple technologies (xDSL, GPON, PTP fiber).
- Ability to leverage the Triple Play Service Delivery Architecture (TPSDA).

Cautions

- New leadership team and organization announced in November, to be effective as of 1 January 2009, following the appointment of new Chairman and CEO in September.
- No support for EPON.

Calix

Geographic Focus: North America. Technology Focus: GPON and PTP.

Strengths

- Strong position in North American GPON market, supplemented by strength in DSL and multiservice access market.
- FTTP customer base of more than 300.
- The company has a multi-vendor interoperability and compatibility certification program known as “The Calix Compatible Solution Assurance Program.”
- Extensive optical network terminal (ONT) range including the Calix 700GX ONT series, which supports both GPON and PTP Active Ethernet from the same ONTs.

Cautions

- Limited company size can become an issue as the market scales into high volumes and low cost, although the company has demonstrated its ability to leverage and scale contract manufacturing.
- Company size also an issue in relation to the networkwide transformation plans that most carriers are facing.
- Lack of penetration into Tier 1 NSP segment.

Cisco

Geographic Focus: Europe, the Middle East and Africa (EMEA) and selected markets in Asia/Pacific. Technology Focus: PTP.

Strengths

- Strong position in PTP market in EMEA – solution is well suited for building open FTTH networks.
- Leading position in service provider router (SPR) market and strong video capabilities via former Scientific Atlanta acquisition; offers competing vision for HFC network transformation to deep fiber for cable operators.
- Ability to deploy solution in combined business and residential environments (ME 3400 series designed for this scenario).
- Ability to leverage parts of strong enterprise portfolio – benefits from this in terms of cost and features.

Cautions

- No GPON or EPON products.

ECI

Geographic Focus: EMEA and Asia/Pacific. Technology Focus: GPON via multiservice access node (MSAN).

Strengths

- GPLT4E is a GPON linecard solution for the Hi-FOCuSTM MSAN family, allowing copper and fiber-based access to coexist on the same platform.
- The GPON linecard solution includes an onboard network processor providing quality of service (QoS), multicast and security service-enabling capabilities.
- Network intelligence features supporting open access business models.

Cautions

- Limited FTTH customer base.
- Lack of penetration into Tier 1 NSP segment.

Enablence

Geographic Focus: North America-centric but worldwide customer base. Technology Focus: GPON, GEAPON and PTP.

Strengths

- The Trident 7 platform supports both IEEE 802.3 GEAPON, IEEE 802.3 PTP and ITU G.984 GPON standards.
- Enablence’s FTTH Networks Division, built around the acquisition of Wave7 Optics, has a customer base in excess of 120 worldwide.
- Demonstrated capability to build an FTTH system using own transceivers, ONTs and optical line terminals (OLTs).
- Recently announced acquisition of Pannaway Technologies adds breadth to the customer base and depth to the product portfolio by means of DSL products.
- Early presence in cable operators’ networks.

Cautions

- Limited company size can become an issue as the market scales into high volumes and low cost.
- Company size also an issue in relation to the networkwide transformation plans that most carriers are facing.
- Lack of penetration into Tier 1 NSP segment.

Ericsson

Geographic Focus: Worldwide. Technology Focus: GPON and PTP.

Strengths

- PTP (EDA 1200) and GPON (EDA 1500) solutions that both offer very-high-bit-rate DSL (VDSL2) support, and track record with passive infrastructure associated with FTTH deployments (Ribbonet and Micronet solutions).
- FTTH solutions part of full service broadband architecture.
- Well positioned in neighbor segments (DSL, SPR and optical transport) and video portfolio via Tandberg Television acquisition.
- Strong worldwide professional services track record.

Cautions

- Relatively late with GPON – volume shipments did not start until 3Q08.

Fujitsu

Geographic Focus: Japan. Technology Focus: GEAPON and GPON.

Strengths

- Strong position in the mature Japanese FTTH market.
- Several years’ large-scale deployment experience from Japanese market.
- Ability to leverage technology and skills from strong position in optical transport market.

Cautions

- Limited ability to export success from Japanese market to other markets, although a GPON product (Flashwave 6100) is available for the North American market.

Hitachi

Geographic Focus: Japan and North America. Technology Focus: EPON, GEAPON, GPON and RFoG.

Strengths

- Long history in the FTTH market – has produced APON, BPON, EPON, GEAPON, GPON and RFoG solutions.
- Track record in both North America and Japan.
- RFoG solution introduced targeting cable operators.
- Vertical integration with access to own components.

Cautions

- Limited success with Tier 1 NSPs outside Japan.

Huawei

Geographic Focus: Worldwide. Technology Focus: GPON, EPON and PTP.

Strengths

- Portfolio of FTTH products includes solutions for GPON, EPON and PTP.
- Strong position in neighboring segments such as DSL, optical transport and SPRs.
- Ability to offer both “pay as you grow” and “revenue sharing” sales models for FTTH.
- Very well positioned for the high-volume, low-cost scenario that will play out in FTTH as it did for DSL.
- Proven capabilities in professional service offers to carriers.

Cautions

- Lack of transparency regarding Huawei’s financial status.
- Winning large FTTH projects in North America will be a challenge, even with locally based R&D facilities.

Mitsubishi

Geographic Focus: Japan. Technology Focus: EPON, GEAPON and PTP.

Strengths

- Very strong position in the mature Japanese FTTH market.
- Several years’ large-scale deployment experience from Japanese market.

Cautions

- Limited ability to export success from Japanese market to other markets.

Motorola

Geographic Focus: North America. Technology Focus: GPON and Cable-PON.

Strengths

- Leveraging strong position as incumbent cable television (CATV) equipment provider.
- Supplier to Verizon FIOS project – initially BPON, but also extended to GPON.
- Platform built for use both in North America (AXS2200 OLT) and internationally (AXS1800 OLT).
- Cable PON strategy for leveraging PON technology to upgrade hybrid fiber coaxial (HFC) architectures with compatibility to existing DOCSIS technology.

Cautions

- Not so well positioned in FTTH neighbor segments (except CATV) as some of its closest competitors.
- Will be challenged in the FTTH market outside North America – this could become an issue as the expected high-volume, low-cost scenario unfolds.
- Financial viability to overall company and uncertainty with time frame for spin-off of mobile assets.

Nokia Siemens Networks

Geographic Focus: Worldwide. Technology Focus: Next-generation optical access based on WDM PON.

Strengths

- Strong position in neighboring DSL access market.
- Strong position in South Korean market via Dasan Networks.
- Good position to deliver professional services worldwide.
- A number of customer wins for both GPON and GEAPON were announced prior to July 2008 press release (see Cautions below).
- Road map and migration strategy toward next-generation optical access solutions based on WDM technology.

Cautions

- Nokia Siemens Networks announced in July 2008 that the company would limit its investments in GPON and instead direct its fiber access investments toward next-generation optical access solutions as well as DSL opportunities related to fiber to the building (FTTB)/fiber to the curb (FTTC).

Occam Networks

Geographic Focus: North America. Technology Focus: GPON and PTP.

Strengths

- Solution supports GPON, PTP and DSL.
- Solutions deployed at over 300 NSPs in North America and Central and Latin America.

Cautions

- Limited company size can become an issue as the market scales into high volumes and low cost.
- Company size also an issue in relation to the networkwide transformation plans that most carriers are facing.
- Lack of penetration into Tier 1 NSP segment.

PacketFront

Geographic Focus: EMEA. Technology Focus: PTP.

Strengths

- Innovative approach for open access NSPs centered around BECS control and provisioning system.
- Solution allows for multiple network operators on the same network, thus allowing multiple service providers per client.
- Support for DSL and enterprise solutions.

Cautions

- Limited company size can become an issue as the market scales into high volumes and low cost.
- Company size also an issue in relation to the networkwide transformation plans that most carriers are facing.
- Lack of penetration into Tier 1 NSP segment.

Sumitomo Electric Networks

Geographic Focus: Japan. Technology Focus: Gigabit Ethernet passive optical network (GEAPON).

Strengths

- Very strong position in the mature Japanese FTTH market.
- Sumitomo is the leader in the xDSL market in Japan.
- Several years' large-scale deployment experience with the Megabit Gear product line in the Japanese market.
- Joint venture investment in Chinese manufacturer Wuhan Yangtze Optical Technology.

Cautions

- Limited ability to export success from Japanese market to other markets, although a GE-APON contract was announced in June 2007 with Taiwan's Chunghwa Telecom.

Tellabs

Geographic Focus: North America. Technology Focus: GPON and WDM-PON.

Strengths

- Market leader in legacy BPON segment as supplier to early part of Verizon's FiOS project.
- Massive roll-out experience from Verizon's FiOS project.

Cautions

- Access is no longer seen as one of the company's strategic growth areas.
- An issued press release in April 2008 stated that GPON activities focused on Verizon would be discontinued – there was significant signal value because of Tellabs' role in the early part of Verizon's FiOS project, despite ongoing commitment to the GPON market.

UTStarcom

Geographic Focus: Asia/Pacific. Technology Focus: GEAPON.

Strengths

- Low cost structure.
- Can leverage position in DSL market.
- Can leverage experience with large-scale, end-to-end IPTV deployments.

Cautions

- Limited FTTH customer base.
- Low visibility in FTTH market.
- Only GEAPON solution.

ZTE

Geographic Focus: Asia/Pacific and emerging markets. Technology Focus: GPON and EPON.

Strengths

- Ability to leverage position in DSL market (third place in worldwide DSLAM market in 2007) and scale as the FTTH market grows.
- OLTs (ZXA10 series) that are capable of both EPON and GPON – early 10G EPON prototype announced.
- Wide range of EPON and GPON ONUs.
- Growing geographic base, including Western Europe.
- Low cost base.

Cautions

- Relatively small market share (2% of worldwide FTTx market in 2007).
- Challenges remain in penetrating mature markets.
- Marketing needs to improve to grow mind share.

Vendors Added or Dropped

We review and adjust our inclusion criteria for Magic Quadrants and MarketScopes as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant or MarketScope may change over time. A vendor appearing in a Magic Quadrant or MarketScope one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. This may be a reflection of a change in the market and, therefore, changed evaluation criteria, or a change of focus by a vendor.

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor that compete in/serve the defined market. This includes current product/service capabilities, quality, feature sets and skills, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability (Business Unit, Financial, Strategy, Organization): Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all pre-sales activities and the structure that supports them. This includes deal management, pricing and negotiation, pre-sales support and the overall effectiveness of the sales channel.

Market Responsiveness and Track Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word-of-mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the Web site, advertising, customer programs and positioning statements.

Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.