Reader Notes

- **Demand for traditional-architecture large systems has rebounded, but this is not "the good old days."**
- **Large systems will utilize lower-cost technology, retain traditional architectures and strengths, and expand support of "open" interfaces.**
- **IBM lost its dominance in storage, but is attempting to reassert itself.**
- **All vendors will exploit commodity technologies to meet emerging requirements.**
- **IS organizations will struggle to re-engineer themselves for new service missions.**

Conventional data centers are acquiring new systems and upgrades, but the market dynamics and the fundamental drivers of growth are continuing an inexorable shift.

Using advanced technology components that can be leveraged into multiple markets, vendors are striving for flexibility while meeting priority requirements for processor and storage availability and performance.

Conventional IS organizations are struggling to redirect their staffs and re-establish their value in the face of rapid change.

Reader Notes

1. **What are the major drivers of demand for traditional-architecture large systems?**

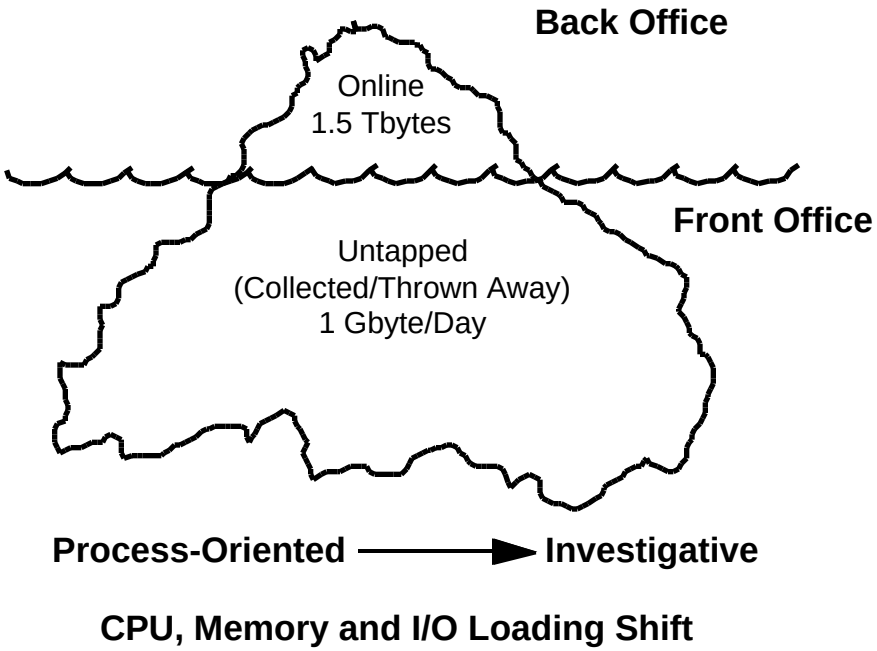
2. **How will traditional-architecture large processors and I/O evolve and be priced during the balance of the decade?**

3. **What strategies are vendors pursuing for today's and tomorrow's markets?**

4. **What are the new roles of centralized IS in the face of factors such as the recentralization of storage?**

What are the major drivers of demand for traditional-architecture large systems?

Reader Notes



Source: Gartner Group

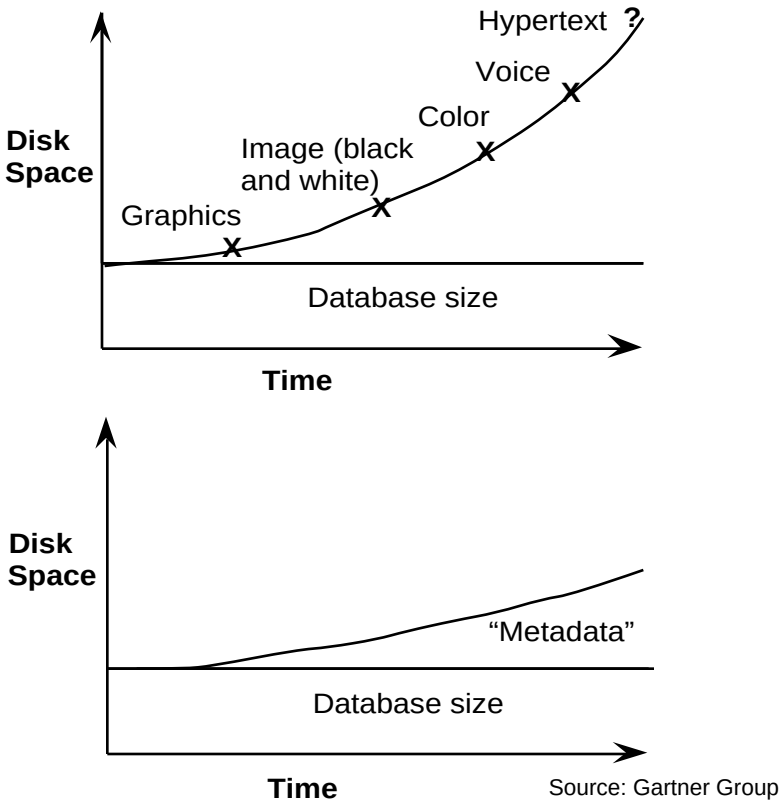
Many enterprises collect vast amounts of machine-readable data via scanners, telemetry and monitoring devices. This data is traditionally summarized (for tasks such as stocking and inventory control) and the detail is discarded. New applications made cost-effective by inexpensive MIPS and storage will utilize the detailed data to characterize customer behavior and buying patterns. Such new applications demonstrate a fundamental shift from conventional automation of back-office tasks (e.g., accounting and payroll) to support of executive-office tactical and strategic planning (e.g., data mining).

- New applications will cause dramatic shifts in capacity and functional requirements of information infrastructures (0.7 probability).
- Traditional process-oriented computing will increasingly move to "discovery" and investigative processing (0.8 probability).
- Most new applications will be bought rather than developed in-house (0.8 probability).

User-friendly storage systems will cause disk capacity to grow faster than the raw data by at least 15 percent (0.9 probability).

Reader Notes

User-Friendliness' Impact on Disk Space



Source: Gartner Group

Key Issue: What are the major drivers of demand for traditional-architecture large systems?

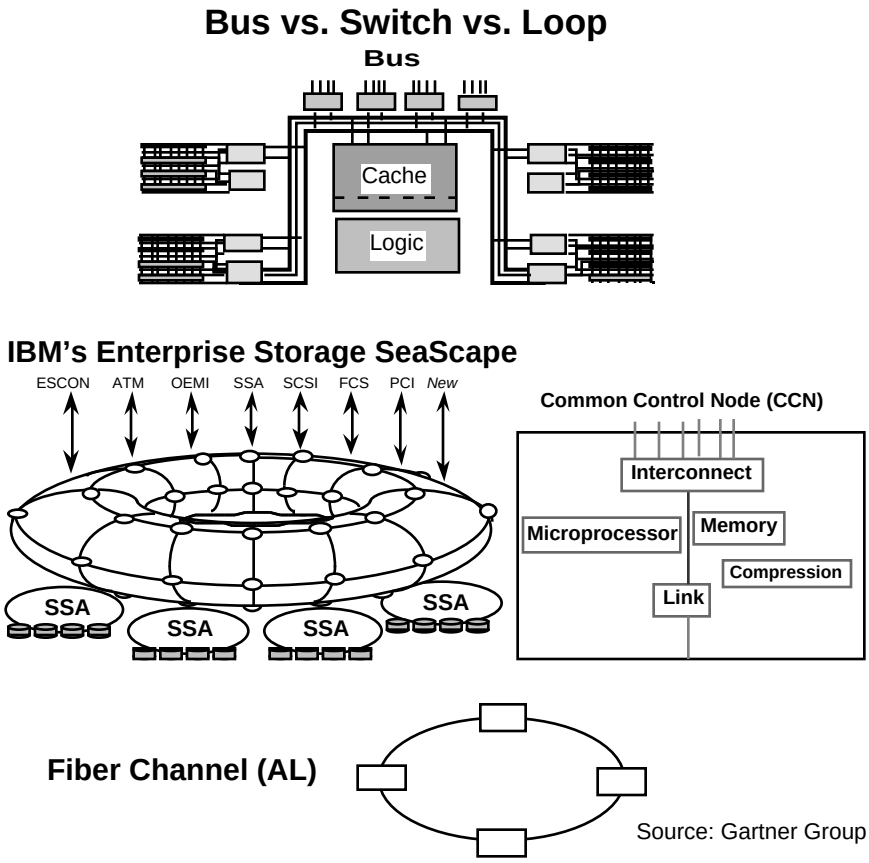
The trend toward user-friendly and end-user computing is compounding storage growth, both by the way the data is stored and by adding additional descriptions to the data stored.

As data becomes more user-friendly, it consumes more storage space. A typical page, for example, takes only 1,000 bytes of disk space in character form; the same data consumes 40,000 bytes in graphic form, and more than 400,000 bytes in black and white image form.

In addition to the raw data, metadata is stored. Metadata is composed of repositories, indices, templates and other descriptions. Metadata is used to insulate the end-user from the technical detail surrounding the data and make it more "friendly." Frequently unrecognized in capacity planning, metadata typically requires more than 15 percent of additional storage space.

How will traditional-architecture large processors and I/O evolve and be priced during the balance of the decade?

Reader Notes



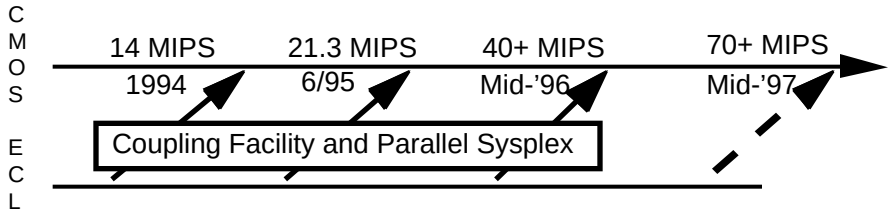
By 1998, IBM will normalize open system and mainframe disk storage pricing (0.8 probability).

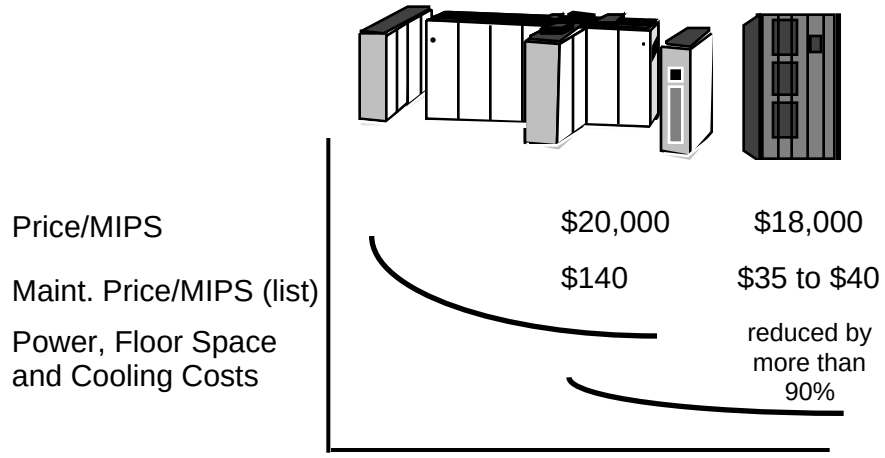
IBM's next generation of storage subsystems will employ a torus-ring architecture in which scalability is achieved by adding bandwidth in three dimensions. Rather than replacing back planes or whole boxes, a card may simply be inserted to add a level to the torus and increase bandwidth. The loop structure provides fault tolerance if an end-node fails. Each common control node (CCN) can include cache, disk control, channel interface and remote link. IBM's new 3590 tape product will use some SeaScape components to link ESCON channels to SCSI drives. Common sets of advanced technology components used in many products enable scalability at low cost.

Most of IBM's open systems storage business is "bundled" with the system platform. Furthermore, integrated storage nodes (ISNs) will be directly connected to processor buses through unpublished interfaces, such as Direct Memory Attach. "Bundling," ISNs, Sysplex and the Coupling Facility could enable IBM to regain market share and slow price erosion (0.6 probability).

In mid-1996, all S/390 PCMs will offer large CMOS technology systems (0.9 probability). By year-end 1997, all traditional mainframe vendors will offer large CMOS systems (0.8 probability).

Reader Notes





Source: Gartner Group

Key Issue: How will traditional-architecture large processors and I/O evolve and be priced during the balance of the decade?

Traditional-architecture large systems are being redefined. While the underlying hardware technology will be CMOS, major transitions are occurring in the architecture and software for exploitation of parallelism and support of "open" interfaces and standards.

The near-term focus by IBM in its evolution of Parallel Sysplex will be on functional performance such as data caching in the Coupling Facility (0.8 probability). Enhanced coupling support will provide remote backup/recovery by late 1998 (0.7 probability) and "Megaplex" (i.e., multiple data centers linked into a single Sysplex) will be feasible by mid-2000 (0.6 probability).

By mid-1997, CMOS uniprocessors of 80 S/390 MIPS will handle all but the most CPU-intensive workloads. However, conventional "batch windows" will become a dominant problem for most large data centers (0.7 probability).

What strategies are vendors pursuing for today's and tomorrow's markets?

Reader Notes

	Assets	Challenges	Tactics
AMH	Transient Top Gun	CMOS in mid-'96 Single product line	5995 Interim Consolidation
Bull	High-end OLTP	Evolve to parallel CMOS in mid-'97	Support open
HDS/CPX	Dual strategy	CMOS in mid-'96 Skyline/M2000 supply Track record	GX8000/99xx interim IBM partnership
IBM	CMOS now Architecture owner	CMOS performance Parallel systems acceptance New applications	Roll base References OE, "P/390"
ICL	OpenVME	Price pressure	VME support of CMOS
SNI	Global storage	CMOS in '96	Dual S/390 and RISC CMOS
Unisys	Products/services	Expand base	Support open

Source: Gartner Group

Traditional large-system vendors are continuing their metamorphoses with interim tactics; sales forces are crucial (0.8 probability).

While the market for traditional-architecture large systems has been strong since late 1993, the second half of the 1990s continues to challenge the large, traditional vendors to develop new organizations, values and cultures. Their major directions remain the same: to reduce product and structure costs and increase competitiveness and profitability; to pursue partnerships for broader offerings, reduced costs, expanded sales coverage and applications development; and to retrain and redirect sales forces.

As Hitachi buys technology through its partnership with IBM, the historical trends in delivery of compatibility may no longer apply (0.7 probability).

Reduced development funding by ISVs (e.g., for exploitation of Parallel Sysplex) will cause a shift toward more IBM software for traditional-architecture large systems (0.4 probability).

IBM will regain 10 to 15 points of market share (0.6 probability), but will fail to dominate the market (0.9 probability).

Reader Notes

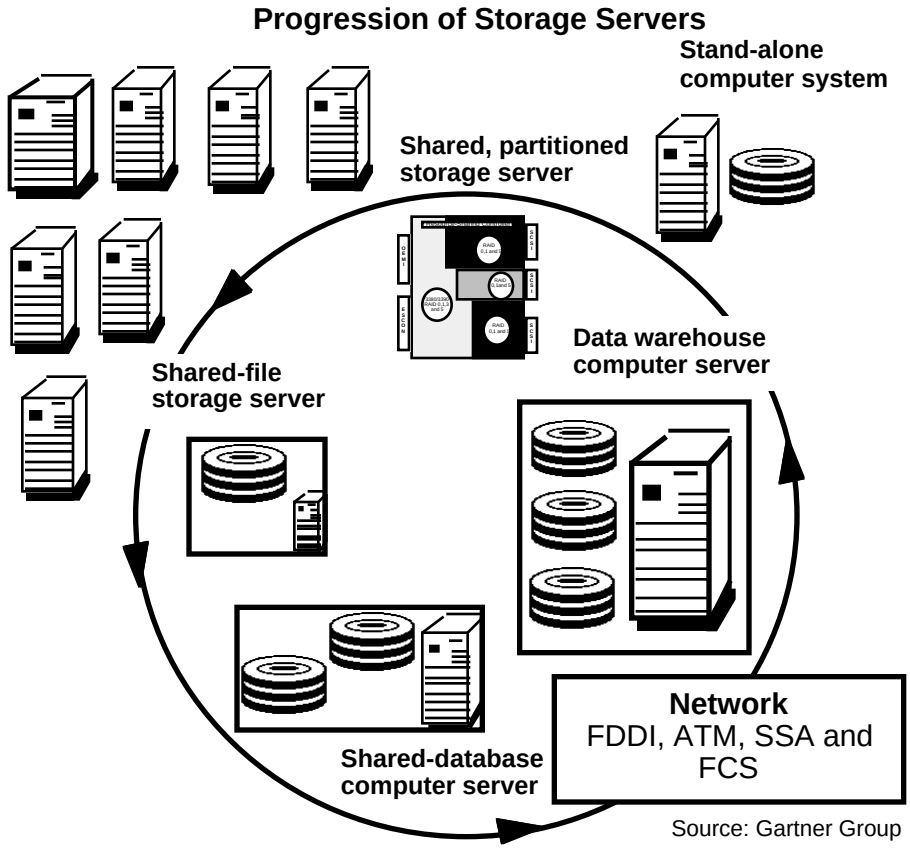
	Assets	Challenges	Tactics
AMH	**Loyal installed base**	Open systems market	Tread water
	Fujitsu partner	Time to market	Partners
	Field force	**Credibility**	**Turnkey solutions**
CRX	Local base	**Growth**	**System integrator**
	Hitachi partner	Added value	Eastern Europe
	Independent		
EMC	Product architecture	**High growth rate**	**Aggressive sales and marketing**
	High margins	Disk supply	
	Rapid development	Testing	Target IBM
	Sales force	Open systems market	Account control
			Growth
HDS	Long-term strategy	Time to market	Leverage technology
	Reputation/products	**Transition away from PCM**	**Develop open systems**
	Hitachi partner	Distribution	100% compatible
	Added value	Open system market	
IBM	**Architectural keys**	Organizational flux	**Price**
	Global presence	Net margins	Scalability
	Manufacturing	**Product transitions**	Connectivity
			Common parts
STK	King of tape	Time to market	Industry segments
	Virtual disk	Emerging competition	Price
	Storage focus	“Fat” organization	**Network storage**
	Vision	**Software**	

Source: Gartner Group

Key Issue: What strategies are storage vendors pursuing for today’s and tomorrow’s markets?

In the traditional S/390 storage market, all vendors face the same issues, i.e., getting products to market and surviving a growing price war. As such, in 1995, Amdahl and HDS will lose DASD market share, while StorageTek will continue to dominate tape for the next 3 to 5 years (0.9 probability).

Long term, the PCMs are all trying to move into other markets or services — such as turnkey solutions or open system markets — to become “real computer companies.”



Source: Gartner Group

Disk technology will not inhibit continued increases in demand (0.85 probability); radically different server configurations will emerge, but will not be widespread (0.8 probability).

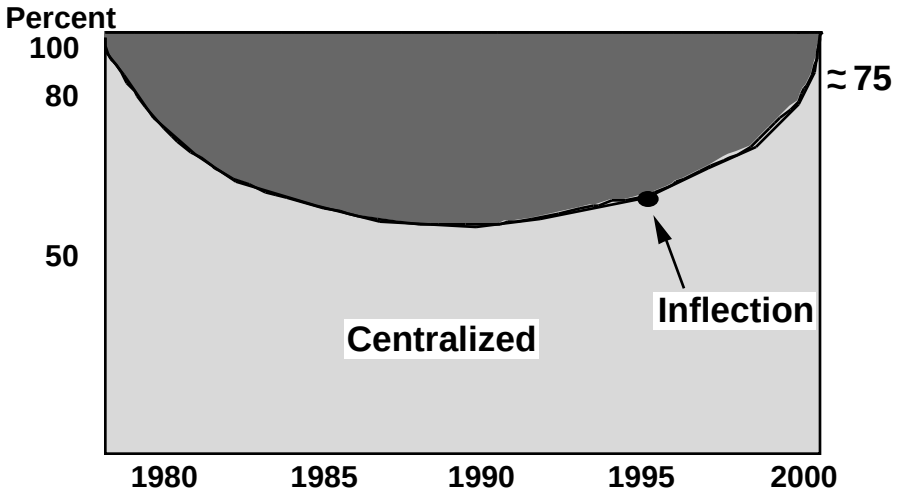
Vendors are moving toward products with broader market appeal, leveraging existing products with offerings for "open systems," a euphemism for Unix, NetWare and/or NT-based systems. In many cases, the products emerging are capable of simultaneously supporting more than one type of system, but with fixed separation of the physical devices accessible from each system. In time the computing capability required for these more-intelligent storage servers can be enhanced to include "smarter" backup/restore capabilities, progressing toward shared files, shared databases and the size-varient found in data warehouses.

Concurrently, systems vendors are targeting shared database applications where systems knowledge is a prerequisite. System/storage interconnect merging with network protocols offers the potential for remote storage for specialized backup servers, stand-alone data and information servers as well as disaster-site backups. The evolution of network-based storage servers will be limited because general-purpose computer servers will be adapted and favored over specialized storage-only servers (0.7 probability).

By the year 2000, 70 percent to 80 percent of an organization's shared storage will be centrally located in large data "farms" (0.8 probability).

Reader Notes

Percentage of *Shared Data* That Is Physically Centralized



Requirements
- Capacity
- High availability
- Fast recovery
- Security
- Scalability
- Connectivity

Source: Gartner Group

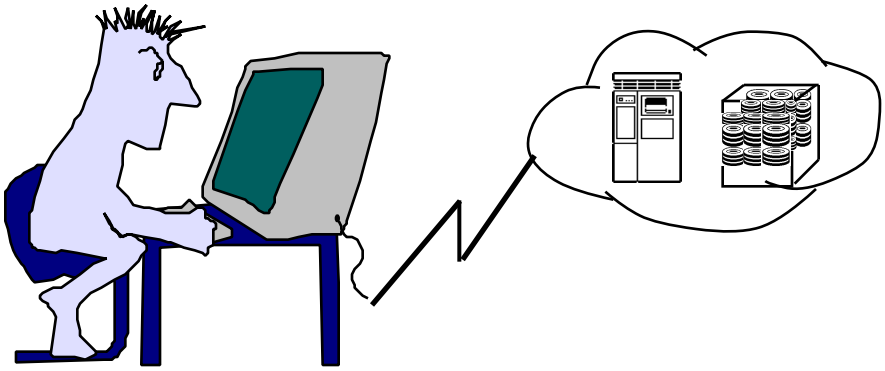
Key Issue: What are the new roles of centralized IS in the face of factors such as the recentralization of storage?

As ownership of machine-readable data has moved from the data center to user departments, so has responsibility for its management. User departments are now realizing that they do not have the budget, inclination or skills to manage this growing quantity of data. Thus, departmental servers are being moved into data centers for professional data management and physical security. This process of recentralizing shared storage will continue. By 1999, more than 60 percent of shared storage will be backed and managed by large central servers (0.7 probability).

Similarly, users want to share and pool nonmainframe data that is being stored or mirrored in centralized data hubs (e.g, the "glass house" or smaller, but similar, facilities). Developers will broaden their offerings to capitalize on this trend (0.8 probability).

Information infrastructures will offer transparent, controlled access with tailored services. Data centers will become service centers (0.8 probability).

Reader Notes



Centralized IS must:

- Build a framework for communications
- Integrate IT capabilities into business strategies
- Support users to mitigate costs/exposures (including disaster recovery planning)
- Encourage users to be self-sufficient
- Reinvent costing/charge out in user terms
- Assist in platform selection
- Lead effort on year 2000 “crisis”
- “Sell” users *and* executives on value

Source: Gartner Group

Key Issue: What are the new roles of centralized IS in the face of factors such as the recentralization of storage?

Traditional IS organizations must focus on re-establishing their value while mapping clear routes to avoid escalating costs and exposures.

Physical security and reduced support costs are elementary justifications for centralizing support of departmental servers. However, headcount and funding will be the major obstacle to evolution of the conventional data center to such new service missions (0.8 probability).

Users Should:

- Pursue a just-in-time acquisition strategy to take advantage of continuing price erosion and scalable/ granular processor and storage offerings, while maintaining an awareness of the secondary market.
- Begin immediately to budget, staff, analyze, plan and implement corrective measures required in application portfolios for problems caused by the “year 2000.”
- Ensure that disaster recovery plans support the platforms selected for new critical applications.
- Aggressively market skills, services and value, both horizontally and vertically.

- IBM has gambled everything on CMOS and Parallel Sysplex, and will deliver timely performance, reliability and exploitation (0.7 probability).
- System storage demand will accelerate due to new applications and “user friendliness” (0.8 probability).
- Systems integration will be the greatest challenge both for users of applications and enterprise IS, which must guide the companywide information infrastructure (0.8 probability).
- Enterprise IS must manage and administer enterprise applications and the services delivered via companywide infrastructure (0.7 probability).