CHAPTER 1
Fundamentals of location value

Introduction

Creating value

If we begin with the premise that the purpose of a business is to create value, how do we identify specific value? In the private sector, this value is typically revealed in products and services that are successful in the marketplace. Technology companies provide products that are purchased, real estate companies provide homes and office buildings that are purchased or leased, and consultants provide advisory services that are procured. Every sector of industry, including government and nonprofits, has a range of specific value that it creates.

From a competitive perspective, this value is framed within the context of a company's unique "value proposition" to its customers. J. C. Anderson, J. A. Narus, and W. Van Rossum (2006) identified three types of value proposition: all benefits, comparative advantage, and resonating focus. An all-benefits value proposition represents the comprehensive set of customer benefits a company provides, whereas a comparative advantage value proposition highlights its value relative to the competition. A resonating focus value proposition—considered the gold standard of value propositions—identifies the key points of difference that will deliver the most compelling value to the customer.

The challenge of location analytics is to provide business insight into how location affects these value propositions, considering a host of geographic, economic, technological, environmental, and societal factors.

Sustainable value

Although many companies rightly focus on their value proposition to customers, broader value considerations affect their business activities and decisions. In the five decades since economist Milton Friedman famously proclaimed that the sole responsibility of business is to make a profit, there has been a growing recognition that the purpose of a company transcends its profit-making capacity. On August 22, 2019, in recognition of this expanded view of the role of business in society, the prestigious US Business Roundtable announced a revised articulation of the purpose of a business (Business Roundtable 2019). This broader perspective, backed by 181 of the top US companies, includes the following dimensions: delivering value to customers, investing in employees, dealing fairly and ethically with suppliers, supporting communities, embracing sustainable business practices, generating long-term value for shareholders, and engaging effectively with shareholders. As Darren Walker, president of the Ford Foundation, observed at the time of the announcement, "This is tremendous news because it is more critical than ever that businesses in the twenty-first century are focused on generating long-term value for all stakeholders and addressing the challenges we face, which will result in shared prosperity and sustainability for both business and society" (Business Roundtable 2019).

These developments are often framed within the context of corporate social responsibility, or CSR, and, more recently, environmental, social, and governance (ESG) factors. KPMG (2020), a British-Dutch accounting services network, has conducted an annual survey since 1993 on global corporate CSR/ESG activities and reporting. At the time of the 1993 survey, only 12% of the top companies (N100) in surveyed companies were reporting on their CSR/ESG activities. As of 2020, this reporting had grown to 85%. Moreover, the growth in ESG reporting in the top global corporations (G250), which KPMG started surveying in 1995, has risen to 90% (figure 1.1). Companies are clearly seeing the connection between their actions and the surrounding world and the need to track and address societal and environmental factors that could inhibit their success. For example, that same 2020 survey found that reporting on the threat of global climate change as a financial risk had grown dramatically for both groups, with 43% of top global companies (G250) and 53% of top national companies (N100) noting this financial risk.
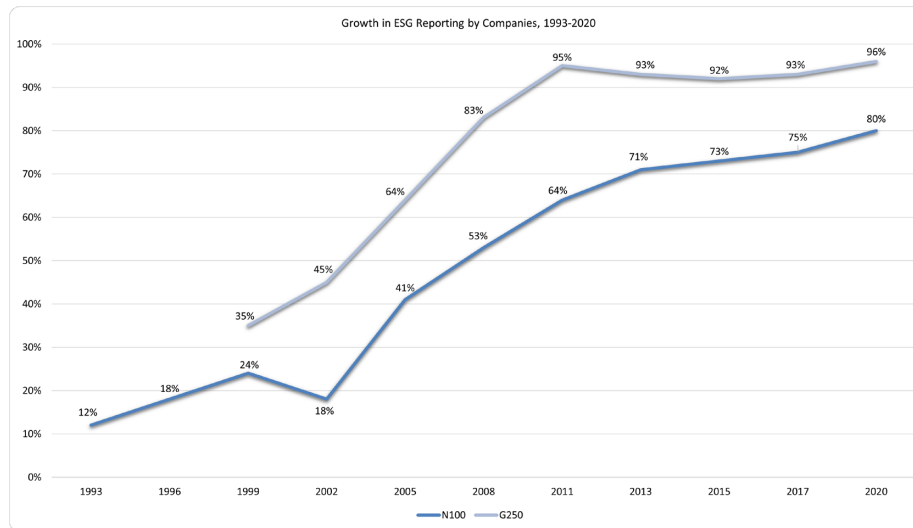
Figure 1.1. Growth in ESG reporting by top national and global companies. Trends for top national and global companies are displayed in dark-blue and light-blue lines, respectively. Source: KPMG 2020.

The COVID-19 pandemic has only served to intensify the interlinks between companies and societal conditions. During the pandemic, businesses have had to radically change employee work patterns and relationships with customers and do their part to safeguard the health and safety of all those within their business ecosystem—all of it amid dramatic economic and employment contractions and locational changes. It has become clear that the health and safety of employees is not only of great consequence when they are at work but also depends on the conditions of the environments and communities they live in and travel to.

Turning to the focus of this book, business location analytics also has a role in advancing this broad purpose of business in delivering value to customers, communities, and the global environment. Such a role can be best introduced by considering the spatial decision cycle that enhances business value.

Spatial decision cycle

Considering these various dimensions of value, ranging from a product to a societal impact, how can you start to think spatially about enhancing such value through location analytics? It is useful to consider a cycle of four elements in a spatial decision process: value, spatial thinking, location analytics, and data (figure 1.2). The cycle begins with understanding the value created

by a company's products and services. It then considers the spatial dimension of the value created, followed by the appropriate location analytics suggested by this spatial thinking. The cycle then turns to the data requirement for achieving the desired location-analytics insights and concludes with the value added by these insights for business priorities.
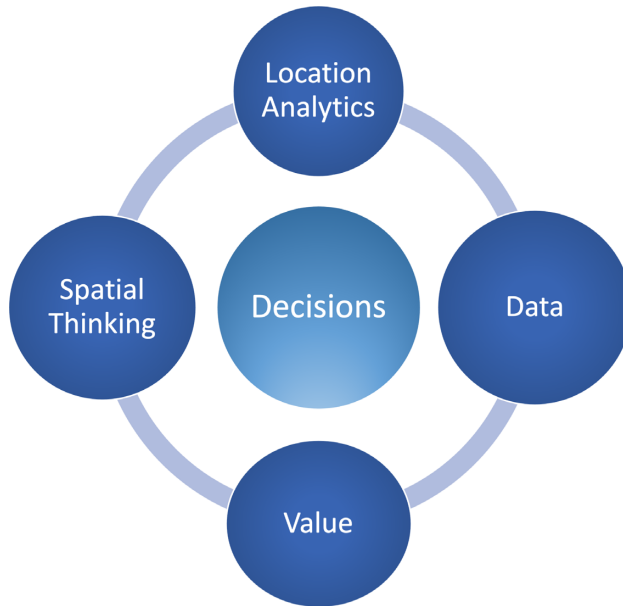
Figure 1.2. The spatial decision cycle, showing the links between its key elements: value, spatial thinking, location analytics, and data.

The spatial decision cycle

Element 1: Value (proposition)

From a strategic perspective, spatial decision-making begins with business goals to deliver a company's value proposition through market and customer growth, achieving competitive advantage in offerings, driving operational efficiencies, and managing risk and regulatory compliance. Considering the dimensions outlined by the Business Roundtable, these goals can also include upgrading employee skills, ensuring effective and sustainable supply chains, supporting local communities, and improving environmental conditions.

For example, the case of gourmet coffee company Nespresso (2021a) illustrates a business strategy that embraces these objectives and uses location analytics to achieve them. As the company notes in its business principles, its value proposition is to "promise consumers the finest coffee in the world that preserves the best of our world" (2021a). Similar to the Business Roundtable's new "Statement of Purpose of a Corporation" (Business Roundtable 2019), Nespresso notes, "If we are to be successful—not only as a business, but in delivering on this promise—we know we must earn the trust and respect of our people, our

customers, our suppliers and wider society." As will be outlined in the Nespresso case study (in chapter 7), a key aspect of delivering on this promise is the use of location analytics to monitor and manage achieving a variety of business, environmental, and community goals under Nespresso's "Positive Cup" framework (2021b). Of course, not every company operates in the same context as Nespresso, but a key value proposition can usually be discerned, with priorities that set the stage for spatial thinking.

Element 2: Spatial thinking

This second stage of the cycle focuses on using spatial thinking to translate business objectives into spatial considerations. Spatial thinking is considered a form of intelligence, along with other forms of intelligence such as logical and interpersonal (Gardner 2006). The National Research Council (2006) noted that there are three components to spatial thinking: spatial attributes, spatial representations, and spatial reasoning. In spatial business, spatial attributes refer to the ways to measure and assess location dynamics in trade areas, supply chain transportation, and so forth. Spatial representations include various means of rendering spatial dynamics, such as customer cluster maps, business space-time trend lines, and supply network visualizations.

Perhaps the most important component is spatial reasoning. In spatial business, this calls for constructing a line of inquiry that reveals the influence of location factors on business success. For example, a hospital can examine its supplier network to determine where in the supply chain interruptions are occurring. A retail company can examine trends in sales across different customer markets to determine where new stores should be opened because such locales have a strong presence of desired customer profiles.

A classic example of strategic spatial reasoning is the case of the investment company Edward Jones. Edward Jones started as a small-town investment firm in Missouri. The company viewed its comparative value proposition as providing a single investment service to more rural communities, compared with Merrill, previously branded Merrill Lynch, which

provided full-service portfolios in large metropolitan areas (Collis and Rukstad 2008). In the early 1980s, Edward Jones conducted a series of analyses and consultations and discovered that its resonating value proposition was that it offered a highly personalized investment service to those individual customers who wanted to delegate investment decisions. It further discovered that it could competitively offer these services in select rural and metropolitan locales where such customer profiles were strongly represented. The company then proceeded to operationalize the new market mix. This spatial reasoning resulted in the rapid growth of Edward Jones from 400 to 1,000 locations in a seven-year period and remains its driving focus today (Edward Jones 2021).

Element 3: Location analytics

Clear spatial thinking drives the choice of location analytics. If a business is mostly interested in a general understanding of spatial trends in customers, assets, suppliers, and so forth, descriptive analysis can provide situational awareness through maps and infographics. If a business desires to carry the spatial analysis further, to understand how spatial insights can help achieve business value priorities, explanatory analysis can be conducted to help explain dynamics such as why growth did or did not occur or why certain sites or locations were or were not successful. If a business wants a predictive analysis of the likely success of a service, product, or location, it can conduct predictive spatial analysis. And if a business wants to know where to establish optimal new locations or serve new markets, it can conduct prescriptive analysis. These spatial analysis approaches are reviewed in detail in chapter 3.

Many industries are advancing their analytic capacities to move from descriptive analytics to predictive and prescriptive analytics. As one example, the insurance industry is rapidly evolving to adjust to the more extreme climate conditions brought on by climate change and other sociodemographic and economic changes. Companies such as Travelers Insurance (2021) now employ a full range of location analytics to assist a range of business-critical functions. These include predicting the location of natural disasters (for

The spatial decision cycle *(continued)*

underwriting purposes), analyzing damage locations (for claim purposes), and identifying high-priority locational impacts (for disaster response). These tools have been used with great success for recent hurricanes on the East Coast and wildfires on the West Coast (Claims Journal 2019).

Element 4: Data

The fourth element in the spatial decision cycle is data. As the expression goes, "You are only as good as your data." A business may have a driving need to use location analytics to enhance its success but will be hampered without the appropriate data. Typical data types include sales, profit, customer, cost, asset, and network data. In addition to this proprietary data, numerous governmental and commercial datasets can inform location analysis—for example, trade area analysis, business transactions, supply chain network data, and demographic, social, economic, and environmental trends. Companies are leaning toward digital transformation and so are aligning their business intelligence enterprises, which includes enhanced interoperability of these data sources. This data can be linked to location, often expressed as "georeferenced."

In addition to the need for "location stamped" data, three other data issues that deserve attention are the level of geographic specificity, the availability and consistency of data over time, and the policies surrounding data use. Regarding the first of the three, the greater the level of granularity, the better the analysis, although many publicly available datasets limit the granularity for reasons of privacy and anonymity. Regarding the second, temporal data is critical for looking at spatial changes over time, such as the growth or decline of customers, sales, inventory, and so forth. And third, various policies can affect the use of data within a company or its ability to share the results of the data. For some industries such as health care, these privacy conditions are well established, such as through the Health Insurance Portability and Accountability Act (HIPAA) of 1996, whereas for other industries such as retail, privacy issues are emerging around location-based services.

Element 5: Value (added)

The cycle concludes with the consequence of location analysis in contributing to business success. This may include value added to business priorities such as driving growth, improving operations, managing risk, and ensuring regulatory compliance. To the extent possible, this contribution should be documented in terms of the type and amount of value contributed and the stakeholders who received this value. There are several dimensions to consider in determining this value: depth, breadth, use, internal stakeholders, external stakeholders, and financial contribution, as summarized in table 1.1.

Beginning with depth, this value type refers to the value delivered to a specific business function such as marketing or operations. Breadth refers to the value delivered across business functions as the organization increases its spatial maturity. Then, there are different use values. These can include the value that location analytics has in informing stakeholders, through situational awareness; in decision-making; in contributing to business goals; and, ultimately, in contributing to the business mission.

Like beauty, value is in the eye of the beholder. There are internal stakeholders who perceive value, ranging from employees carrying out specific organizational functions to the ladder of middle, senior, and executive managers and leaders. There are external stakeholders who perceive value, including customers, partners, suppliers, distributors, and the public. Finally, there is the traditional estimation of value, often framed within the context of return on investment (ROI). This can be in the form of a formal or quantitative ROI or a more qualitative summarization of the value elements noted above. The former can be particularly appropriate when the costs and benefits can be easily parsed.

Most importantly, this version is but one iteration of the spatial decision cycle. The cycle should be considered ongoing and integrated into decisions regarding key business priorities. A case example of this tight integration is The Shopping Center Group, which we consider next.

Case example: The Shopping Center Group

The Shopping Center Group, or TSCG, is a leading national retail-only real estate service provider in the US. It has 20 offices in the US, 215 team members, and 28 GIS specialists (known as mappers). Over the last decade, the company has come to tightly integrate the use of business-focused location analytics that deliver business value to its customers and its organization (The Shopping Center Group 2021).

TSCG has four main service lines: tenant representations, project leasing, retail property sales, and property management of those retail properties. As TSCG's former Chief Strategy Officer Gregg Katz noted, "At the core of everything is GIS research. We consider GIS research to be the heartbeat of the organization. It allows all four of those service lines to tell a story" (Esri 2017). Each of the four service lines engages in ongoing spatial decision cycles—that is, what is the property in question? What are the business objectives for the property? What location analytics will inform decisions about the property? What data can be applied to this analysis? What recommendations come out of this cycle of analysis?

In this way, location analytics is providing considerable value to TSCG. Table 1.1 provides a summary of this value in terms of the dimensions described above. Beginning with value to key business functions, location analytics provides value to the company's marketing and sales support. This support features deep spatial insight into consumer and trade area markets. For example, an analysis conducted on behalf of Columbus Mall in Georgia combined trade area, drive-time, GPS, and psychographic analyses to pinpoint key market considerations to guide the selection of potential tenants for that commercial property.

Table 1.1. Value of location analytics for The Shopping Center Group

Value	Domain	Value to The Shopping Center Group
Depth	Value Within Marketing and Sales Support	Deep spatial insight on relative consumer and trade-area markets for commercial properties
Breadth	Value Along Key Business Priorities	Drives overall value proposition as an information-focused technology enabled commercial real estate company Success of brokers and growth of company
Use	Inform, Decide, Grow, Avoid	Used to inform brokers, decide on commercial selections, and avoid mismatches between commercial property types and surrounding markets
Who: Internal	Internal (Analysts, Managers, Sales, Operations, C-suite)	1:4 "mapper" to broker ratio C-suite vetting and management of commercial properties
Who: External	Clients and Partners	Multilayer commercial real estate maps for clients and partners
Results/ROI	Direct Input to Competitive Advantage and Growth	Key contributing component to 30% growth of company, and mission as an analytics-focused commercial real estate company

As table 1.1 shows, location analytics is part of the overall TSCG value proposition as an information-focused, technology-enabled commercial real estate company, and it spans a wide range of value types. It informs brokers and partners, it aids in their decision-making process, and it helps the company grow while avoiding costly market assumption errors in retail commercial transactions.

These location analytics insights and products are used by a wide range of stakeholders. Internally, brokers and other analysts have ready access to the 28 mappers who fuel the analysis. This utilization rises to the C-suite level, in which every major deal is required to have a location analytics review as part of the vetting process. Considering the highly integrated nature of location analytics in the TSCG mission, processes, and product lines, its ROI value is considered within the context of overall corporate success. In this case, company executives consider it to be a key contributor to TSCG's 30% growth and its emergence as a commercial retail and information company.

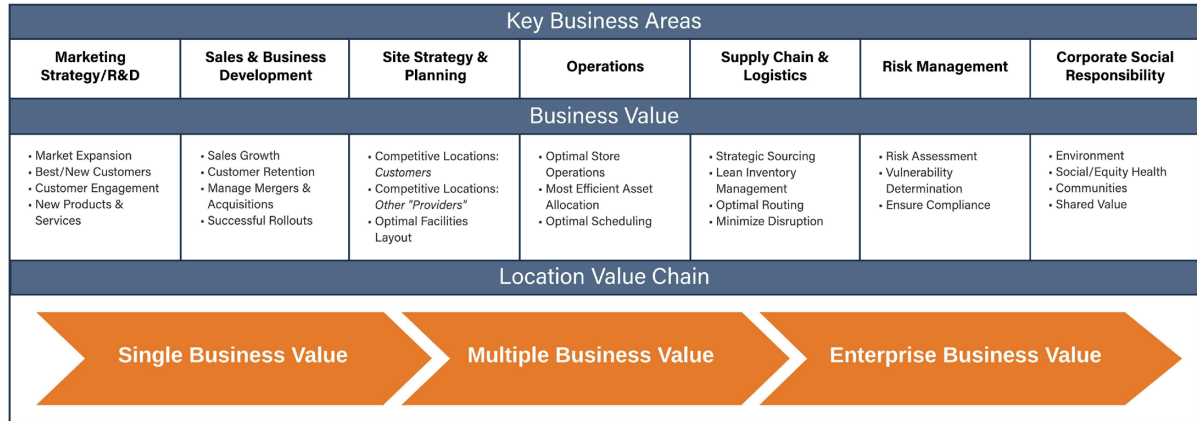# Location value chain

The use of location analysis across business dimensions can be considered the *location value chain*. The concept is a variant of Michael E. Porter's seminal *value chain*, which outlines the various business processes that combine to create value in terms of products and services delivered (Porter 1998b). A business's location value chain captures those business functions that

benefit from location analytics and thus contribute to the overall value of the company.

Depending on the business value being pursued, location analytics can be deployed across a range of business functions (figure 1.3).

| Key Business Areas						
Marketing Strategy/R&D	**Sales & Business Development**	**Site Strategy & Planning**	**Operations**	**Supply Chain & Logistics**	**Risk Management**	**Corporate Social Responsibility**
Business Value						
• Market Expansion • Best/New Customers • Customer Engagement • New Products & Services	• Sales Growth • Customer Retention • Manage Mergers & Acquisitions • Successful Rollouts	• Competitive Locations: *Customers* • Competitive Locations: *Other "Providers"* • Optimal Facilities Layout	• Optimal Store Operations • Most Efficient Asset Allocation • Optimal Scheduling	• Strategic Sourcing • Lean Inventory Management • Optimal Routing • Minimize Disruption	• Risk Assessment • Vulnerability Determination • Ensure Compliance	• Environment • Social/Equity Health • Communities • Shared Value
Location Value Chain						
Single Business Value ➤ Multiple Business Value ➤ Enterprise Business Value						

Figure 1.3. Location value chain, comprising business functions and business needs within each function that prompt the use of location analytics.

Location analytics can be used across the following basic business functions:

- Research and development (R&D), including service and product development, new market development, acquisition due diligence, and location siting
- Marketing, including market expansion, customer segmentation, and customer retention
- Business development and sales, including product rollout, mergers and acquisitions, and sales growth
- Operations, including asset management and facilities management
- Site strategy, including trade area analysis, competitive analysis, and facilities layout
- Supply chain, including sourcing, operations, network analysis, tracking, and simulation
- Risk management, including risk assessment, management, recovery, and resiliency
- CSR, including employee health, social equity, community impacts, and shared-value creation

A variety of studies have documented the range of use for location analytics across this value chain. In 2018, the University of Redlands (2018) in

Redlands, California, conducted a survey of 200 businesses that had at least initial adoption of location technology to determine patterns of location analytics use. The survey found that an overwhelming majority (86%) of surveyed businesses report moderate to high use in more than one function (figure 1.4). Overall, 51% of businesses use GIS in one to three functions, 35% use GIS in four to six functions, and the remaining 14% use GIS in seven to nine functions. Figure 1.4 shows levels of use for nine major business functions, with GIS usage highest for R&D (58%), followed by operations (50%), services (48%), information technology (IT) (48%), sales and business development (47%), and marketing (43%).
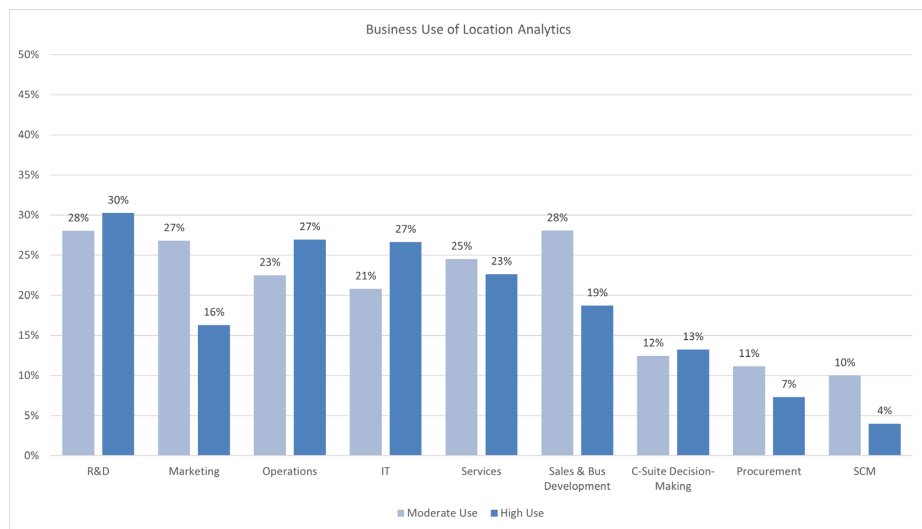
Figure 1.4. High and moderate use of location analytics in business functions along the location value chain (high use in dark blue and moderate use in light blue).

In terms of the overarching business motivations for using spatial analysis, 46% of the survey respondents reported moderate to high motivation for improving the competitive posture of the business. This was followed by GIS use to optimize business performance (39%), for effective risk and disaster management (31%), and finally for regulatory compliance (28%).

In a closer look at customer-centric activities, GIS use is highest for analysis of spatial patterns of customers (46% indicate moderate to high use) yet lowest for tracking and measuring sales activities (29%), pointing to a gap in GIS use for these purposes. In the middle are GIS use for customizing marketing strategies (38%), predicting future customer trends (36%), and optimizing sales territories (31%). Apart from tracking and measuring sales, GIS use for customer and sales activities seems to decline as the purpose of

deriving location intelligence shifts from descriptive to predictive to prescriptive in nature.

Turning to operations, GIS use is highest among the following activities: space and location decisions (58% indicate moderate to high use), spatial field data collection (56%), tracking and managing asset allocations (43%), predicting future operational needs (36%), and managing logistics and supply chains (20%). As in customer and sales activities, moderate GIS use surpasses high use for operational activities.

Pandemic influences on the location value chain

The COVID-19 pandemic of 2020 profoundly influenced the location value chain of many businesses. With the disruption of operations, location analytics played an important role in assessing the challenges to business continuity, which varied by location. Businesses had to move quickly to close, modify, or continue with operations, depending on a variety of federal, state, and local conditions. The pandemic also had major impacts on business supply chains, most visibly on the health-care supply chain, in which the crisis exposed risks associated with the global, just-in-time systems that had come to dominate the medical device and supplies industry. In addition, businesses needed to have locational information on employees to ensure their safety and take appropriate action if they or their coworkers were exposed to infection.

As businesses enter a postpandemic era, new value propositions are emerging that will affect the location value chain of businesses. Within the retail sphere, online, on-ground hybrid models are being extended. McKinsey & Company (2020) reported that many customers have also tried new omnichannel models. For example, buy online, pickup in store (BOPIS) grew 28% year over year in February 2021, and grocery delivery was up by 57%. McKinsey further notes that many of these new engagement models are here to stay. Consumers report high intent to continue using models such as BOPIS (56%) and grocery delivery (45%) after the pandemic. As these business models evolve, they will create new opportunities to integrate location analytics into the new normal of business operations.

Drivers of spatial maturity

Spatial maturity involves the deepening of location analytics use across the location value chain. Looking at the range of use, the University of Redlands (2018) survey estimated that roughly one of five businesses (22%) uses GIS enterprise-wide, spanning multiple departments. At the other end of the spectrum, one of five businesses (20%) reports GIS usage to be very limited. In the middle, 28% of businesses report their GIS usage to be currently limited but poised to grow soon, whereas another 25% indicate GIS usage to be moderate and steady. Overall, business use of GIS has the potential to grow in the near term. However, charting a path for spatial business transformation is essential.

In determining the factors that contributed to achieving spatial maturity, the survey found five that played an influential role. The more advanced, spatially mature companies had (1) a perception of the value of location analytics, (2) a clear and coherent business strategy, (3) C-suite sponsorship and support, (4) availability of best-in-class technology, and (5) clear articulation of ROI.

Turning to inhibitors of spatial maturity, International Data Corporation (IDC) and Esri Canada (Lewin 2021) identified several factors as "challenges" to achieving deeper spatial maturity. Cost, culture, appropriate skill set, integration challenges, and data quality issues were identified as inhibitors that could impede the growth and use of location analytics in companies.

Various forecasting reports provide a generally bullish outlook on the future use of location analytics. This is due to at least these eight drivers of location analytics use:

- Growing geospatial ecosystem
- Deepening use across a range of industry applications and verticals
- Increasing availability of spatial analytics tools
- Integration of location analytics with business intelligence
- Widening range of location services
- Growing indoor location analytics
- Rise of associated advanced technologies
- Rise in global environmental, societal, and health challenges

Drivers of location analytics use

Driver 1: Geospatial ecosystem

Location analytics is part of a larger geospatial ecosystem that includes Global Navigation Satellite Systems (GNSS), GIS/spatial analytics, Earth observation, lidar, space-time visualization, augmented/virtual reality (AR/VR), and artificial intelligence (AI). The global geospatial solutions market is projected to reach US$502.6 billion by 2024 from an estimated US$239.1 billion in 2019, at a compound annual growth rate (CAGR) of 13.2% during the forecast period (Sreedhar and Bhatnagar 2019). The cornerstone of this industry is GNSS, which provides the technological backbone for the industry and accounts for approximately 59% of the total value. This has fueled the growth of GIS/spatial analytics as the second-largest segment of the industry, with growth expected to double by 2022 (GMC 2019).

Driver 2: Industry use

Consistent with the University of Redlands survey, other industry outlooks have documented deepening use across a range of industries. For example, the Dresner Advisory Location Analytics Survey (Dresner 2019) found that location analytics was viewed as critical or very important across a range of vertical industries. Some 93% of survey respondents viewed location analytics as having some importance to their organization, and more than 53% noted that it was critically or very important to their organizations. In terms of specific vertical markets, the survey found this to be especially true for health care, business services, financial services, consumer services, and manufacturing. Each of these sectors viewed location analytics as critical or very important to their organizations.

Driver 3: Spatial analytics tools

Spatial analytics tools continue to expand in their areas of application and their capabilities. In terms of broad solution sets, geocoding (and reverse geocoding), reporting and visualization, thematic mapping and analysis, and data integration/extract, transform, load (ETL) are each expected to grow substantially by 2024 (Sreedhar and Bhatnagar 2019). The ability to effectively geocode data is particularly helpful in making a range of industry data available for location analytics, such as customer, business, product, and supply chain data. Thematic mapping and analysis growth will continue with the availability of increasingly sophisticated analytics. Reporting and visualization tend to increase demand both within businesses and from their external stakeholders. As the volume and value of data continue to grow, there is a strong need for integration across different systems, including business intelligence (BI) systems.

Driver 4: Business intelligence integration

Further fueling this growth is the increasing appetite for the business insights provided by location analytics. Dresner Advisory (2021) reports that R&D, marketing and sales, and executive management are expected to experience the highest growth for BI penetration (which includes location analytics) through 2024 and that "better decision-making" is the primary objective of BI use, followed by related key business areas such as (in descending order) growth in revenues, operational efficiencies, increased competitive advantage, enhanced customer service, and risk management. Increased integration into BI software suites and reports provides a natural path for location analytics to contribute to business growth and competitiveness.

Driver 5: Location services

The rise of location-based services (LBS) has provided unprecedented opportunities to customize offerings and customer experiences. The related rise of real-time location systems (RTLS) also provides unprecedented opportunities to track assets, personnel, and products. As an industry, LBS/RTLS services is expected to grow rapidly (CAGR of 20.1%) to become a US$40 billion market by 2024 (Sreedhar and Bhatnagar 2019). GPS-enabled mobile devices have spurred an entirely new dimension to retail marketing and customer services.

Driver 6: Indoor location analytics

Related to the growth of LBS and RTLS, indoor location analytics is growing rapidly as industries begin to appreciate its value, especially in operational

Drivers of location analytics use *(continued)*

efficiencies and risk management. For example, health care is considered a prime use of RTLS, and RTLS use in this sector is expected to grow by CAGR 18% to a US$6.84 billion market by 2027. Across industries, the COVID-19 pandemic has heightened the need to track and monitor personnel locations for health, safety, and other risk management measures. LBS/RTLS is also disrupting traditional distribution center workflows and processes, as evidenced by the innovative distribution center techniques deployed by such retail giants as Amazon, Target, and Walmart. As the penetration of the Internet of Things (IoT) and other location-based technologies deepens, new applications will emerge. At the same time, privacy and security threats will condition the extent to which such solutions are deployed, and this constraint could vary widely across regions and cultures.

Driver 7: Advanced technologies

A range of advanced technologies will provide numerous opportunities to extend and deepen the use of location analytics in business and contribute to the ongoing digital transformation of business. The IoT has already led to a pronounced rise in indoor GIS, particularly in the retail sector. The COVID-19 pandemic has heightened the need for and use of georeferenced IoT devices to track supply chains, analyze human travel patterns, and monitor health conditions. Advances in AI are enabling machine and deep learning across a range of business domains, such as analyzing and predicting customer buying patterns, operational improvements, and threats to business continuity. These and other AI applications make up what is known as GeoAI. Of course, IoT, AI, and related technological advances would not be feasible without continued advances in big data platforms and applications. Specific to location analytics, the geospatial industry is moving to highly cloud-based and Web GIS platforms with integration to big datasets and location analytics applications.

Driver 8: Global environmental, societal, and health challenges

The eighth driver is the changing environmental, health, and societal context in which businesses operate. In terms of the environment, the private sector is increasingly treating climate change as a contextual condition that can have a significant impact on business success. This impact is across the location value chain, affecting companies' ability to source sustainable suppliers and retain resilient supply chains through increasing volatile climate conditions. Societal issues range from racial equity, income disparities, and broadband access to other factors that can affect a company's performance and success in different regions and communities. The COVID-19 pandemic has raised awareness of the massive impact that such an outbreak can have on all aspects of the economy and the need to build resiliency into supply chains and operations.

At the macro level, M. Porter and M. Kramer (2016) have emphasized the concept of "creating shared value—pursuing financial success in a way that also yields societal benefits." They note: "Collective impact is based on the idea that social problems arise from and persist because of a complex combination of actions and omissions by players in all sectors—and therefore can be solved only by the coordinated efforts of those players, from businesses to government agencies, charitable organizations, and members of affected populations." There are many examples of such shared-value initiatives that rely on locational information. These include locationally targeted partnerships for economic development, training suppliers on sustainable practices relative to their local community, and public-private collaborations on relief during the COVID-19 pandemic.

Global location analytics outlook

These eight drivers, as well as other influences, are expected to result in considerable growth in location analytics across the globe. Location analytics as an industry is expected to rise from US$7.8 billion (2017) to US$22.8 billion (2024), representing 16.6% CAGR (Sreedhar and Bhatnagar 2019). This growth is expected to be worldwide. Currently, the major regional markets are North America (34.8%), Europe (28%), and Asia Pacific (20.4%). Leading to 2024, these will continue to be major markets with the largest growth (17.1% CAGR) expected in the Asia Pacific region. The Middle East and Latin America are expected to remain smaller regional markets, although each region is expected to have noteworthy growth (Sreedhar and Bhatnagar 2019).

The strongest growth (figure 1.5) is projected in supply chain planning and optimization (17.3%), sales and marketing optimization (17.1%), customer experience management (16.7%), remote monitoring (16.3%), and emergency response management (16.3%).
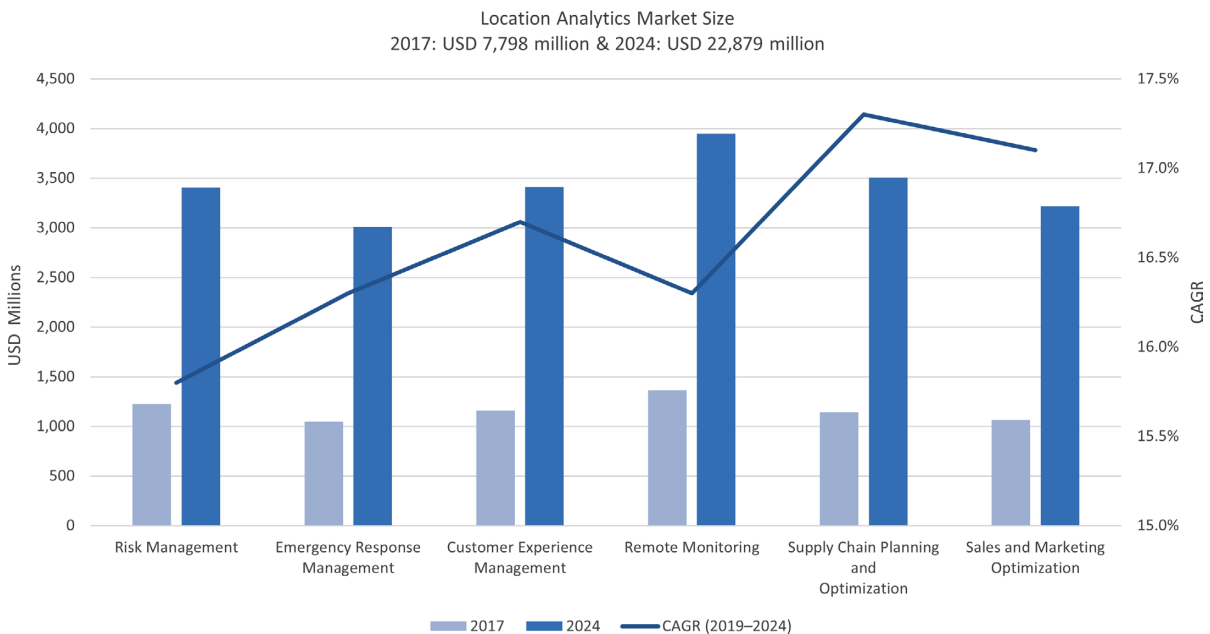
Figure 1.5. Global outlook for location analytics across business functions, with the base year (2017) in light blue and the forecast year (2024) in dark blue. Source: Sreedhar and Bhatnagar 2019.

In summary, the location value foundation outlined in this chapter serves as an organizing set of concepts, principles, and examples for understanding the business location value of any company, a value that includes organizational success within a societal context. As organizations broaden and deepen their use of location analytics to achieve business priorities and goals, location analytics can become more integral to a company's mission. Various market forecasts suggest that such deepening use will indeed be the case around the globe and across a wide range of industries and business functions. This growth, in turn, contributes to and benefits from the need to integrate across business intelligence systems, geospatial platforms, and various new technological systems and products as they arise. These technology issues are taken up next in chapter 2 in terms of a spatial business architecture and the technology needed to achieve it.