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# Monetizing the Cloud-Based Network

*A Heavy Reading white paper produced for Google Cloud in collaboration with MATRIXX Software and Nokia*

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## INTRODUCTION

One of the constant challenges that communications service providers (CSPs) have had to successfully navigate over the past few decades is determining how to monetize the technology they deploy. This challenge remains front and center as CSPs execute their cloud-based transformation strategies.

To gain insight into how CSPs plan to monetize the cloud, Heavy Reading partnered with Google Cloud in collaboration with MATRIX Software and Nokia to create a detailed survey designed to provide granular insights into specific cloud monetization-related topics. These include the following:

- CSPs' preferred cloud deployment models, applications, and/or core functions prioritized to run on the public cloud.
- The impact of emerging business models such as business-to-business-to-X (B2B2X).
- The role of artificial intelligence (AI), machine learning (ML), and automation.
- The extent of perceived monetization barriers.

This Heavy Reading white paper presents the key findings and supporting data points from the web-based global CSP survey that was conducted in July 2022 (see **Appendix A** for the survey demographics).

To understand data sensitivity trends, each of the 10 survey questions was filtered based on annual revenue. Two filter groups were utilized:

- **Tier 1 CSPs:** Those with at least \$1bn USD in annual revenue.
- **Tier 2/3 CSPs:** Those with less than \$1bn USD in annual revenue.

## CLOUD MONETIZATION PRIORITIES AND DEPLOYMENT MODELS

The initial strategic decision that CSPs must make in embarking on their cloud monetization journey is to agree on the cloud type(s) they will support. The options range from singularly supporting their own private network cloud to relying on public cloud partners—or some combination of approaches.

As **Figure 1** below illustrates, the latter combination strategy resonates most with the CSPs that Heavy Reading surveyed. In this case, 77% of respondents are focusing on a hybrid cloud strategy that integrates various types of clouds, such as private and public clouds.

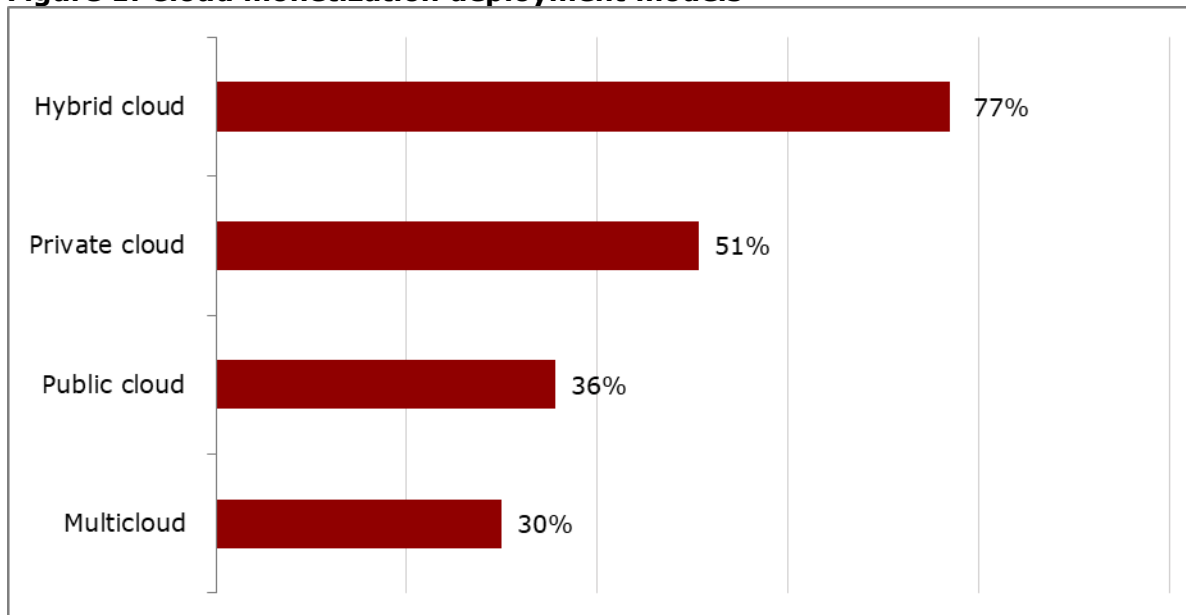
In second place is the private cloud option, selected by just over half (51%) of the respondents, followed by the public cloud option (36%).

The fourth option, the multicloud approach, supports combining multiple instances of the same type of cloud, typically multi-vendor public clouds. It had the support of less than a third of respondents (30%).

Support for the hybrid cloud model and the second-place ranking of the private cloud option is logical. These results align with Heavy Reading's view that to successfully monetize the cloud and drive new revenue streams, CSPs must adopt a holistic cloud strategy versus a single cloud-only approach.

Tier 1 and Tier 2/3 CSPs agree on the value of the hybrid cloud deployment model as the preferred approach (Tier 1 = 85% vs. Tier 2/3 = 71%). Tier 1 CSPs are more committed to multicloud deployments (39%) than their Tier 2/3 counterparts (23%).

**Figure 1: Cloud monetization deployment models**



Question: What cloud monetization deployment models are your organization considering? (Select all that apply) (n=87)

Source: Heavy Reading

The strong level of support for hybrid networks validates that the public cloud will play an important role in cloud monetization. The challenge is prioritizing which of these applications or network functions is optimally suited to the public cloud.

As **Figure 2** below shows, the rollout of 5G acts as a catalyst fueling the transition of applications and network functions to the public cloud. In this case, 5G API-based applications represent the highest priority (55%), followed closely by 5G core network functions (53%).

Utilizing the public cloud for the storage of big data/data warehouses also attracted a strong measure of support (51%).

The remaining rankings include network-based provisioning (40%), then cloud RAN (36%) and operations and business support systems (OSS/BSS) and charging functions (30%).

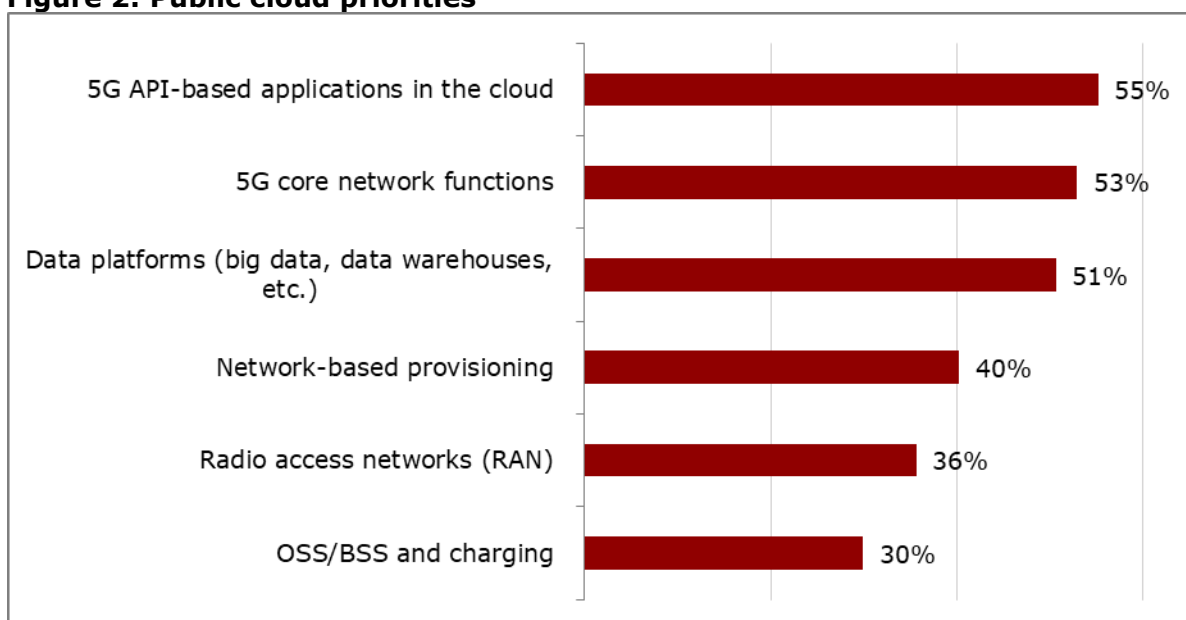
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The top rankings of 5G API-based applications and 5G core network functions are logical since 5G delivers the first wave of API exposure-based services, which are designed to run in private or public clouds.

Heavy Reading believes this API focus is significant since it aligns with hyperscaler API-based service models and provides CSPs with a path to support a new service delivery paradigm essential to competing in a fluid competitive landscape.

In terms of filtered data, Tier 1 CSPs display a much greater commitment to running 5G core network functions in the public cloud than Tier 2/3 CSPs (Tier 1 = 69% vs. Tier 2/3 = 40%). Tier 2/3 CSPs are more committed to utilizing the public cloud for big data functions (Tier 1= 39% vs. Tier 2/3 = 60%).

**Figure 2: Public cloud priorities**



Question: Which applications and/or core functions is your organization prioritizing to run on the public cloud? (Select all that apply) (n=87)

Source: Heavy Reading

The research from the previous figures validates that the cloud—in whatever format—represents the monetization future for CSPs. The next question in the survey extended the discussion to gain additional insight into cloud monetization drivers.

As **Figure 3** below depicts, the leading driver by a substantial margin is scalability (52%). The strong support for this capability was not unexpected since it is clear that CSPs need to optimize and operationalize cloud infrastructure to optimally utilize network resources going forward.

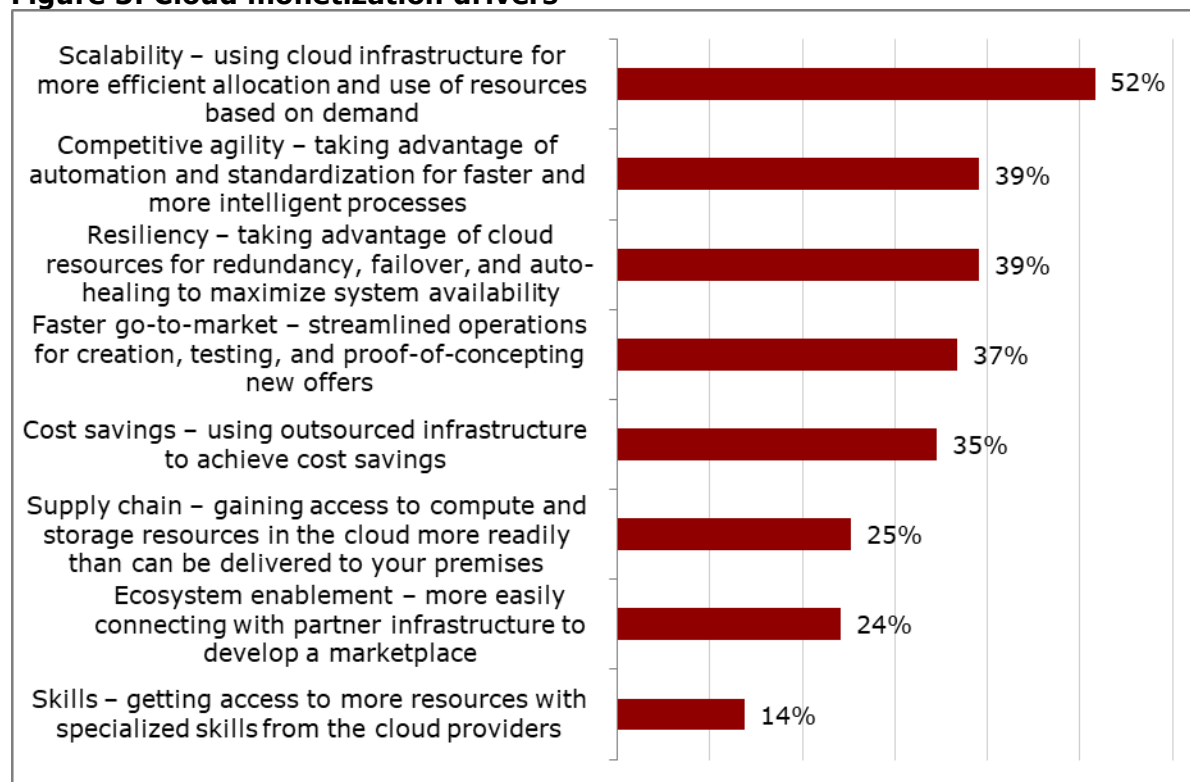
Other drivers with significant support include competitive agility and resiliency (both 39%), faster to market (37%), and cost savings (35%).

About a quarter of the survey respondents also believe that cloud computing and storage access will positively affect their supply chain (25%) and foster ecosystem and marketplace enablement. Only a small sample of the respondents (14%) believe that access to cloud resources and specialized skills from cloud provider partners will drive their cloud monetization strategy.

Scalability is viewed by both Tier 1 and Tier 2/3 CSPs as the leading driver for adopting a cloud monetization strategy (Tier 1 = 54% vs. Tier 2/3 = 50%). Tier 2/3 CSPs place a greater focus on cost savings (Tier 1 = 26% vs. Tier 2/3 = 42%), while Tier 1 CSPs are more focused on competitive agility (Tier 1 = 54% vs. Tier 2/3 = 27%).

Heavy Reading believes Tier 1 CSPs, which possess a larger network footprint, are more focused on competitive agility since they recognize they have the greatest opportunity to enhance network performance and reduce operational costs by implementing automation and standardization-enabled intelligent processes.

**Figure 3: Cloud monetization drivers**



Question: What are the primary drivers for adopting a cloud monetization strategy? (Select top three) (n=87)

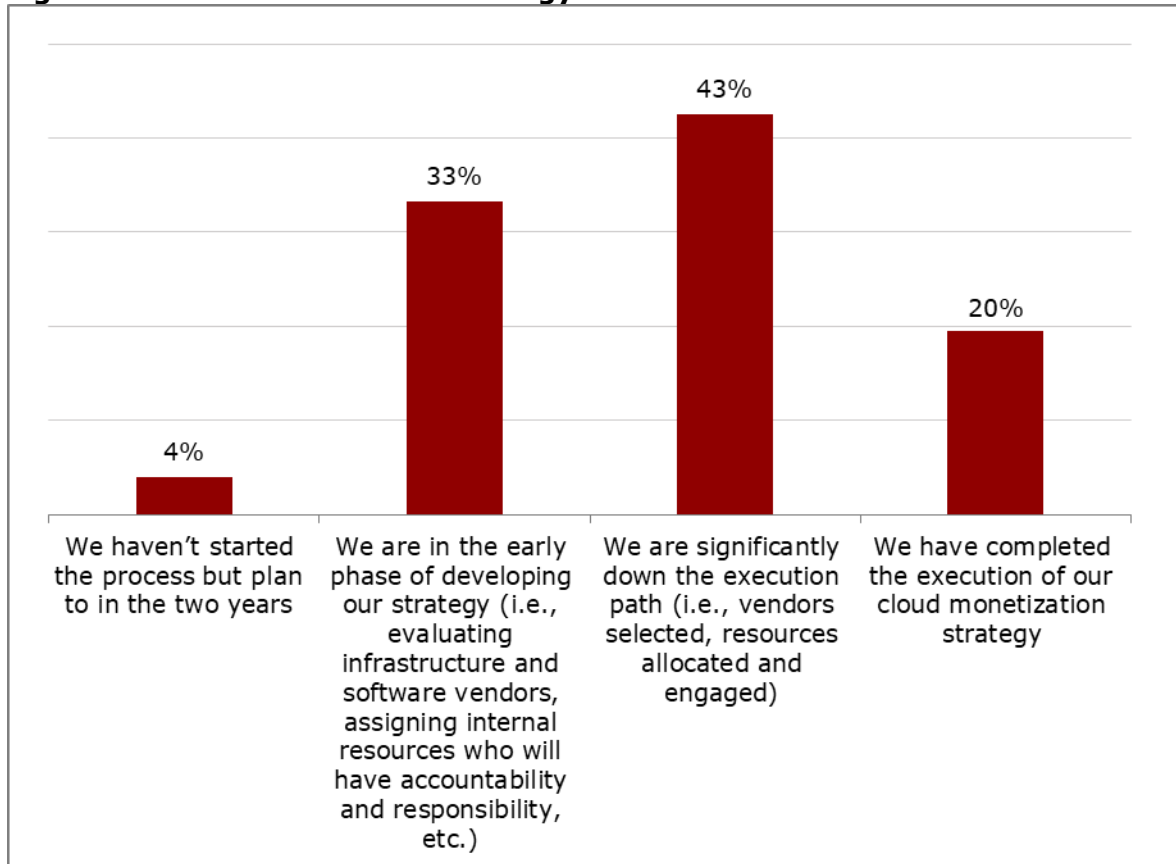
Source: Heavy Reading

Due to the positive benefits of monetizing the cloud identified by the respondents, it only stands to reason that CSPs would consider the implementation of their cloud monetization a strategic imperative.

The data in **Figure 4** confirms this. Overall, 63% of respondents characterize their execution as completed (20%) or significantly down the execution path (43%). An additional 33% of respondents characterize their organization as still in the early phase of strategy development, while only 4% have not yet even started to tackle strategy creation.

About 20% of Tier 1 and Tier 2/3 CSPs have completed their cloud monetization strategy. However, Tier 1 CSPs view themselves as significantly down the execution path (Tier 1 = 56% vs. Tier 2/3 =31%), which is logical given the competitive pressures.

**Figure 4: Cloud monetization strategy status**



Question: Which best describes your organization's cloud-based charging/monetization strategy? (n=87)

Source: Heavy Reading

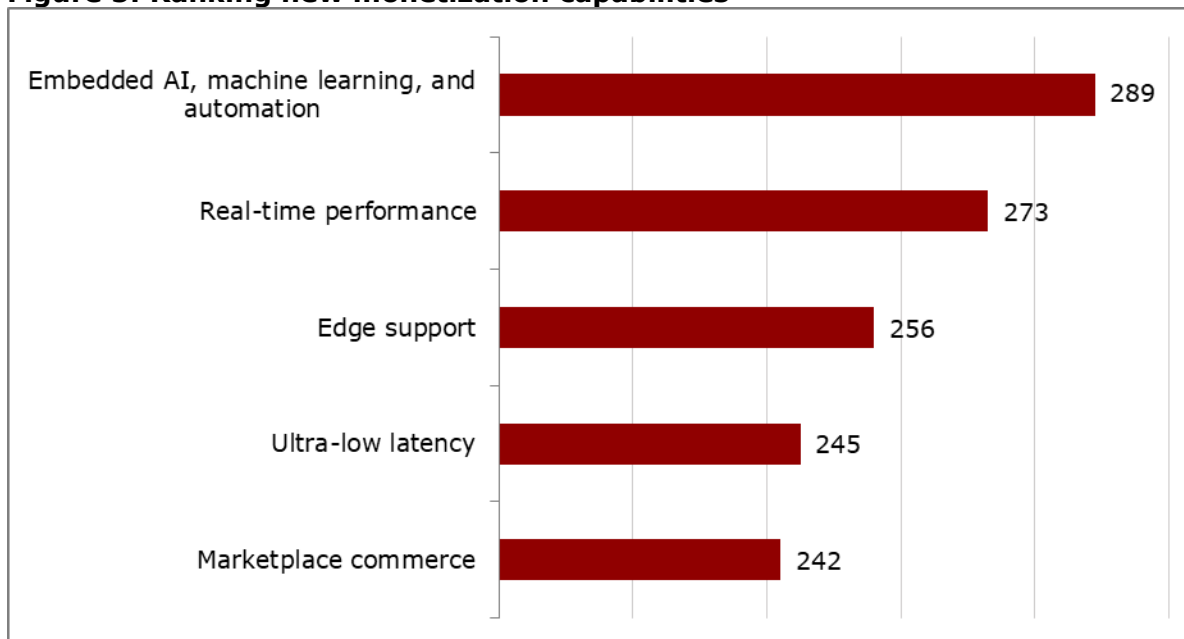
Without question, 5G will intrinsically drive CSPs to embrace new approaches to maximize the return on their 5G investments. These include AI, ML, automation, and edge architectures.

The importance of these capabilities is validated in **Figure 5** below. Based on rankings, AI, ML, and automation achieved the highest numerical ranking with 289 points, followed by real-time performance (273 points) and edge support (256 points).

Ultra-low latency (245 points) and marketplace commerce (242) attained the lowest rankings by a narrow margin. However, in Heavy Reading's view, their overall strong scoring metrics confirm they still represent essential capabilities that will drive monetization.

Similarly, the top three focus areas for Tier 1 CSPs are edge (131), AI (121), and real-time performance (118). AI (168) and real-time performance (155) were the top two priorities for Tier 2/3 CSPs.

**Figure 5: Ranking new monetization capabilities**



Question: Which new monetization capabilities will be most important to maximize the return on your 5G investments? (Rank 1-6) (n=87)

Source: Heavy Reading

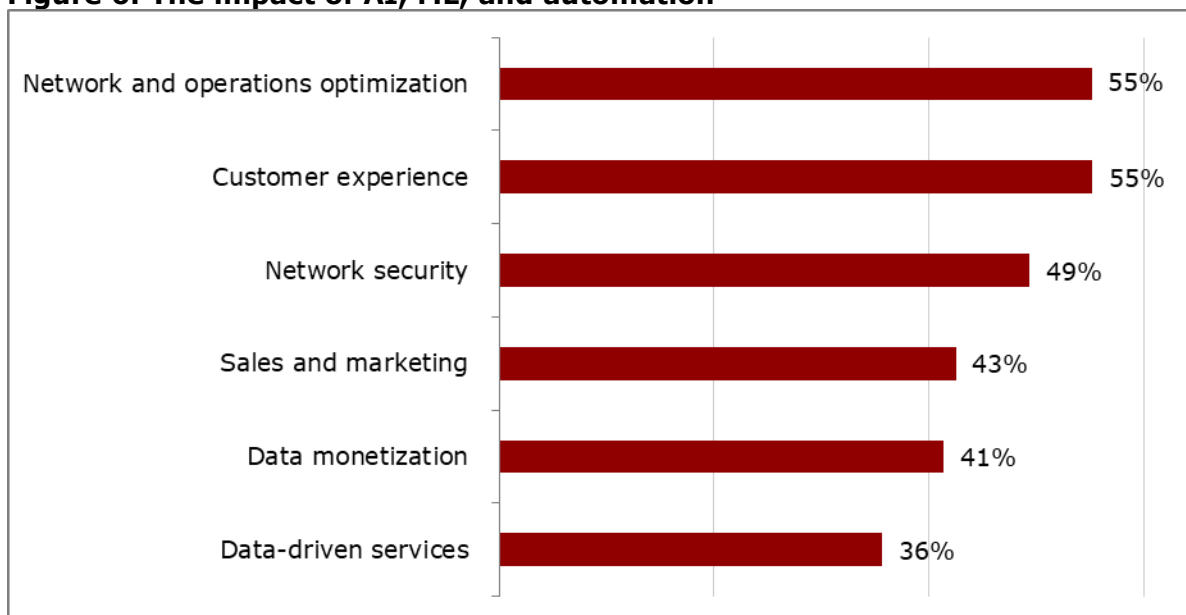
AI, ML, and automation are often anecdotally cited as having a major impact on how organizations such as CSPs deliver and monetize services in the cloud era.

**Figure 6** below provides measurable data on their impact. One reason why AI, ML, and automation are so impactful is that CSPs believe these technologies deliver value on many levels.

Areas with the greatest impact include network operations and optimization (55%), customer experience (55%), network security (49%), and even sales and marketing (43%) and data monetization (41%). Customer experience and network security were selected by both Tier 1 and Tier 2/3 CSPs as the top three priorities.

Heavy Reading interprets this data as confirming that due to their multilevel value propositions, AI, ML, and automation will ultimately become foundational elements for sales and marketing, security, customer experience, and even network and operations teams to consider. Stated differently, AI, ML, and automation will affect both “backend” and “frontend” customer experience functions.

**Figure 6: The impact of AI, ML, and automation**



Question: Where do you see AI, ML, and automation having the most impact on your organization? (Select up to three) (n=87)

Source: Heavy Reading

While technologies such as AI and ML will play a key role in 5G monetization, as **Figure 7** below illustrates, based on the “agree” inputs, there are numerous other residual factors that must be addressed.

Of these, the top three leading considerations include the need to address corporate governance (85%), organizational restructuring (82%), and budget reevaluation and reallocation (81%).

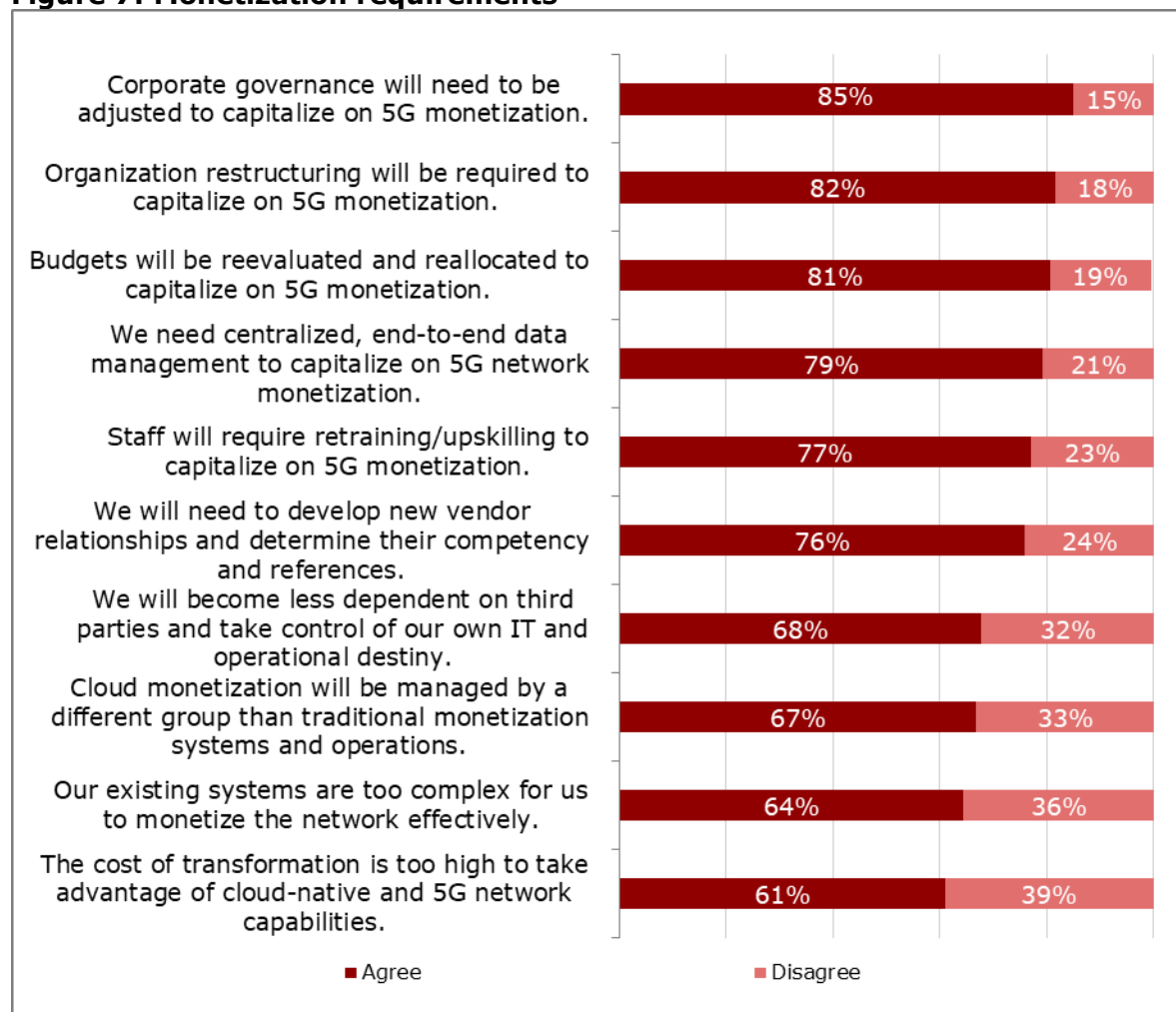
However, the tight ranking of other considerations, such as the need for centralized end-to-end data management (79%), staff retraining (77%), and new vendor relationships (76%), confirms multiple factors (both internal and external) must be addressed in a viable 5G monetization strategy. In other words, 5G will have a major impact on how CSPs manage data, develop employees, and engage ecosystem partners.

It is important to note that the majority of the CSPs surveyed also agree that existing system complexity (64%) and transformation costs (61%) will negatively affect their ability to optimize the monetization curve.

While both Tier 1 and Tier 2/3 CSPs are aligned on the negative impacts of existing system complexity (Tier 1 = 62% vs. Tier 2/3 = 67%), Tier 2/3 CSPs are much more concerned about the high cost of transformation (Tier 1 = 44% vs. Tier 2/3 = 75%).



**Figure 7: Monetization requirements**



Question: Do you agree with the following statements? (n=87)

Source: Heavy Reading

Despite complexity concerns, the previously noted strong level of support for support of 5G APIs in the public cloud (see **Figure 2**) is significant. It confirms that CSPs plan to monetize the data exposure functions of the 5G service-based architecture (SBA) core.

The value of the 5G API and data exposure model is that it is highly programmable and can be leveraged to enhance services utilizing innovative service models.

One example of such a model is the emergence of B2B2X. In this approach, a traditional B2B business model is extended to enable the business paying for a service (the second B) to customize the original service to add additional value for the third party (X). Sliced-based services that rely heavily on data exposure are often positioned as well-suited to the B2B2X model.

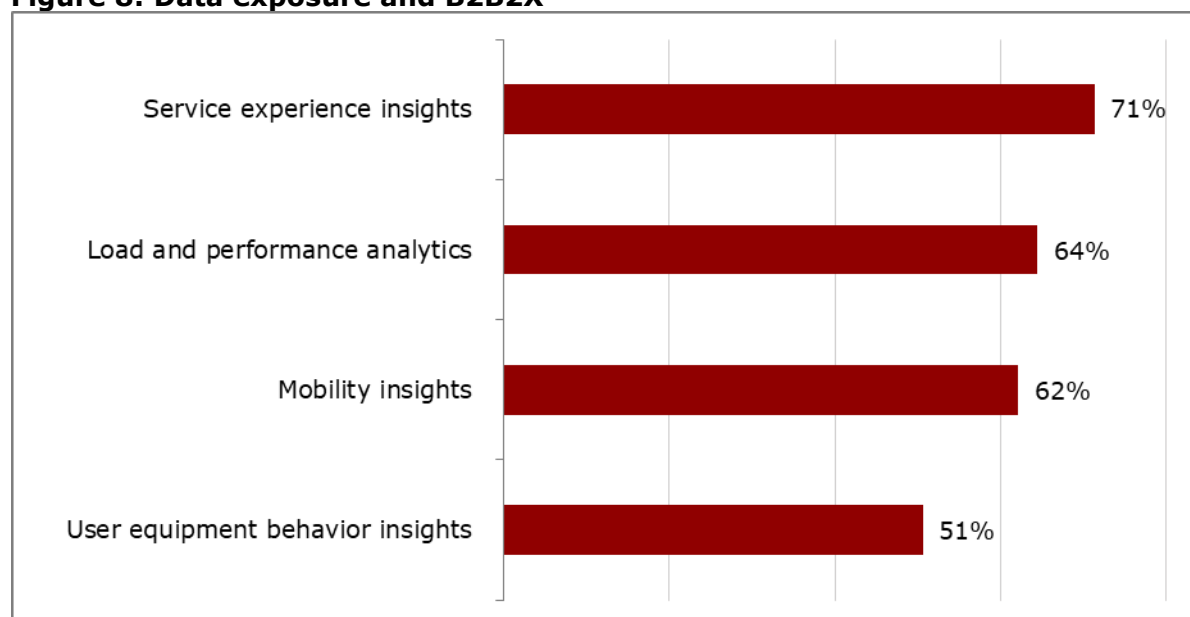
Since slice-based services by nature are designed to be customizable to enhance value-add monetization opportunities, Heavy Reading believes this capability is well-suited to the value-centric B2B2X model. Moreover, this focus represents another example of how CSPs are evolving and investing in additional service delivery capabilities designed to optimize cloud opportunities.

As shown in **Figure 8**, the survey respondents indicated that a range of data will need to be exposed to drive new B2B2X revenue streams. In order of priority, these include service experience insights (71%), load and performance analytics (64%), mobility insights (62%), and, finally, user equipment (UE) behavior insights (51%).

Service experience and analytics garnered strong support from both filter groups. Tier 1 CSPs placed a greater emphasis on the value of mobility insights data (Tier 1 = 80% vs. Tier 2/3 = 48%), while Tier 2/3 CSPs prioritized UE data (Tier 1 = 41% vs. Tier 2/3 = 58%).

Heavy Reading interprets this data as confirmation that the B2B2X model is already viewed by many CSPs as an important monetization model. In addition, multilayer data exposure is vital to successful execution since it ensures a consistent end-to-end digital experience throughout the 5G network.

**Figure 8: Data exposure and B2B2X**



Question: It is estimated that a significant percentage of 5G revenue will come from B2B2X business models. B2B2X refers to a business model where service providers (B) contract services with businesses (B2B), which in turn own the business relationship with (X), which could be partners, suppliers, enterprise customers, and/or consumers. What data needs to be exposed to enable these new revenue streams? (Select up to three) (n=87)

Source: Heavy Reading

To successfully monetize 5G services, CSPs will need to ensure that current and future BSS are capable of meeting or exceeding order management and customer management performance metrics. The challenge is that the existing BSS design complexity may not possess the software flexibility to support 5G services monetization in a hybrid cloud environment.

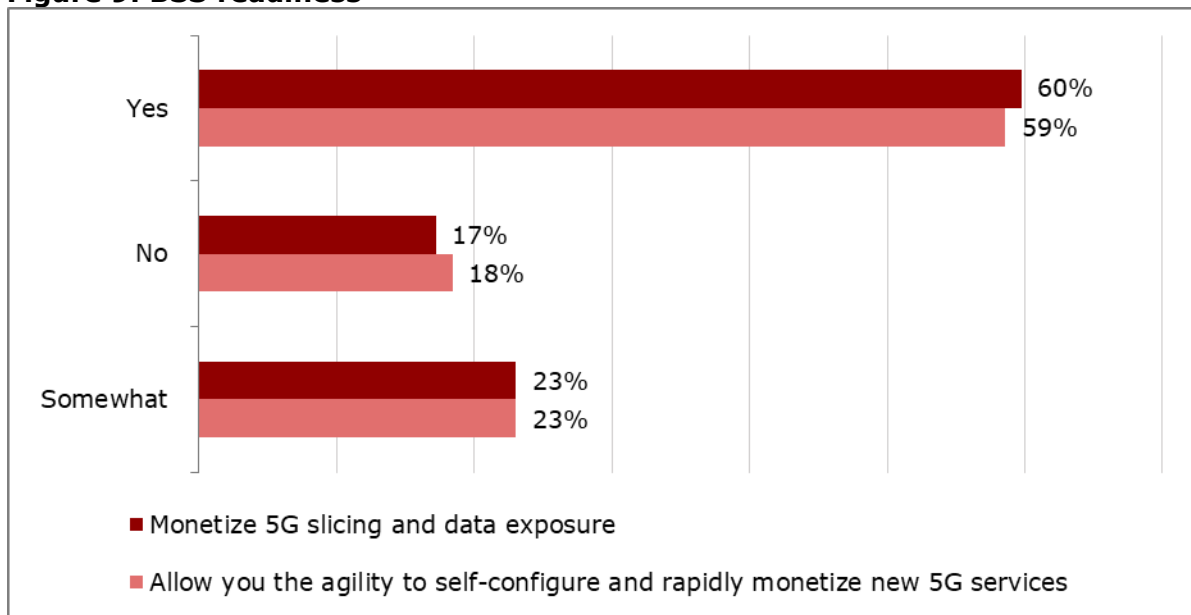
**Figure 9** reflects this sentiment. When asked whether their current BSS could support advanced 5G slicing and data exposure functions, 60% indicated they could, with the remaining 40% split between somewhat (23%) and no (17%). The input is almost identical to the level of agility necessary to self-configure and rapidly monetize new 5G services (59% yes, 23% somewhat, and 18% no).

Based on “Yes” responses, both filter groups are confident that their BSS are agile enough to support 5G slicing, data exposure, and the self-configuration of new 5G services (Tier 1 = 62% and 54% vs. Tier 2/3 = 58% and 63%).

Heavy Reading interprets this data as reflecting that a majority (6 out of 10) of CSPs believe their BSS is up to the task at hand. However, the remaining 4 out of 10 believe additional BSS work is necessary to maximize monetization potential and reduce the complexity aligned with the concerns noted in **Figure 7**.

The fact that a sizable group of CSPs believes additional work is necessary on the BSS front is likely interrelated to the **Figure 4** input. According to those results, a similar sized 37% of the respondents were not significantly down the path in the execution of their cloud monetization strategies. The logical takeaway is that a significant number of CSPs face a significant BSS learning curve as their execution journey progresses.

**Figure 9: BSS readiness**



Question: Is your existing BSS able to do the following? (n=87)  
 Source: Heavy Reading

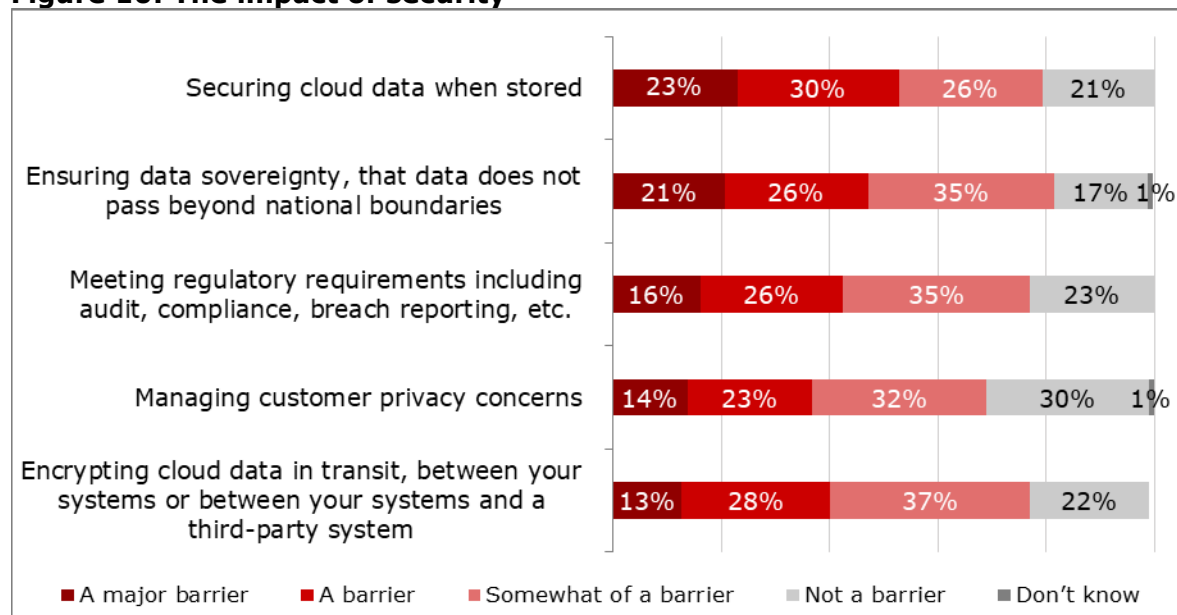
CSPs must also be confident they can secure complex services to avoid 5G monetization barriers. Concerns here range from securing data stored in the cloud to securing cloud data while in motion.

As **Figure 10** illustrates, 53% believe securing cloud data when stored represented “a major barrier” (23%) or “a barrier” (30%). The remaining 47% aligned with “somewhat of a barrier” (26%) and “not a barrier” (21%).

Ensuring data sovereignty was the second-ranked concern, with 21% assessing it as “a major barrier” and 26% as “a barrier.” Heavy Reading believes security system complexity also plays a role in the data storage and management concerns noted. Securing cloud data (Tier 1 = 21% vs. Tier 2/3 = 25%) and data sovereignty (Tier 1 = 23% vs. Tier 2/3 = 19%) represent major barriers for both groups. Tier 1 CSPs are much more concerned about the encryption of cloud data in transit (Tier 1 = 23% vs. Tier 2/3 = 4%).

The level of “major barrier” or “barrier” inputs drops significantly below the 50% threshold for other capabilities. For example, managing customer privacy concerns attained the lowest aggregate score of only 37% (14% “major barrier,” 23% “barrier”). One consideration in this lower ranking is that, as documented in **Appendix A**, many of the respondents tended to perform technical roles and were likely less informed about issues surrounding managing privacy concerns.

**Figure 10: The impact of security**



Question: To what extent are the following security requirements a barrier to your organization successfully monetizing the cloud? (n=87)

Source: Heavy Reading

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## CONCLUSION

The research documented in this white paper validates that many prescient CSPs are well along in the 5G monetization journey. While 20% characterize their execution as completed, the largest group (43%) is significantly down the execution path. This leaves an additional 33% of survey respondents who characterized their organization as still in the early phase of strategy development and 4% who have not started to create a strategy. Not surprisingly, Tier 1 CSPs lead their Tier 2/3 counterparts in terms of strategy execution completion.

More than 75% of the CSPs Heavy Reading surveyed are committed to a hybrid cloud-based monetization strategy. Priorities in this hybrid environment include running 5G API-based applications and core network functions in public clouds.

The value of the 5G API and data exposure model is that it is highly programmable and can be leveraged to enhance the monetization of services of all types. One emerging model that is gaining considerable mindshare is the B2B2X service model.

The research also validates that AI, ML, and automation will play a key role in 5G monetization since they can be applied to many different functions within an organization. Examples include network operations and optimization, customer experience, network security, and even sales and marketing and data monetization.

Also of note is the fact that 7 out of 10 of the CSPs Heavy Reading surveyed believe that executing their 5G monetization strategy must also address cultural and governance issues as well. Top-of-mind topics here include corporate governance, organizational restructuring, budget allocations, and even current vendor relationships.

Although the data trends are overall positive, there are several challenges to tackle. The first concern is complexity related. In this case, 64% of the CSPs indicated they believe that existing system complexity will have a detrimental effect on network monetization. This concern is shared by both Tier 1 and Tier 2/3 CSPs. Heavy Reading believes that the complexity of existing BSS is a factor why 4 out of 10 CSPs believe their BSS are either not ready (17%) or only somewhat ready (23%) to monetize 5G slicing and data exposure.

Security systems represent a similar concern. 53% of CSPs believe securing cloud data represented either “a major barrier” (23%) or “a barrier” (30%) to the execution of their monetization initiatives.

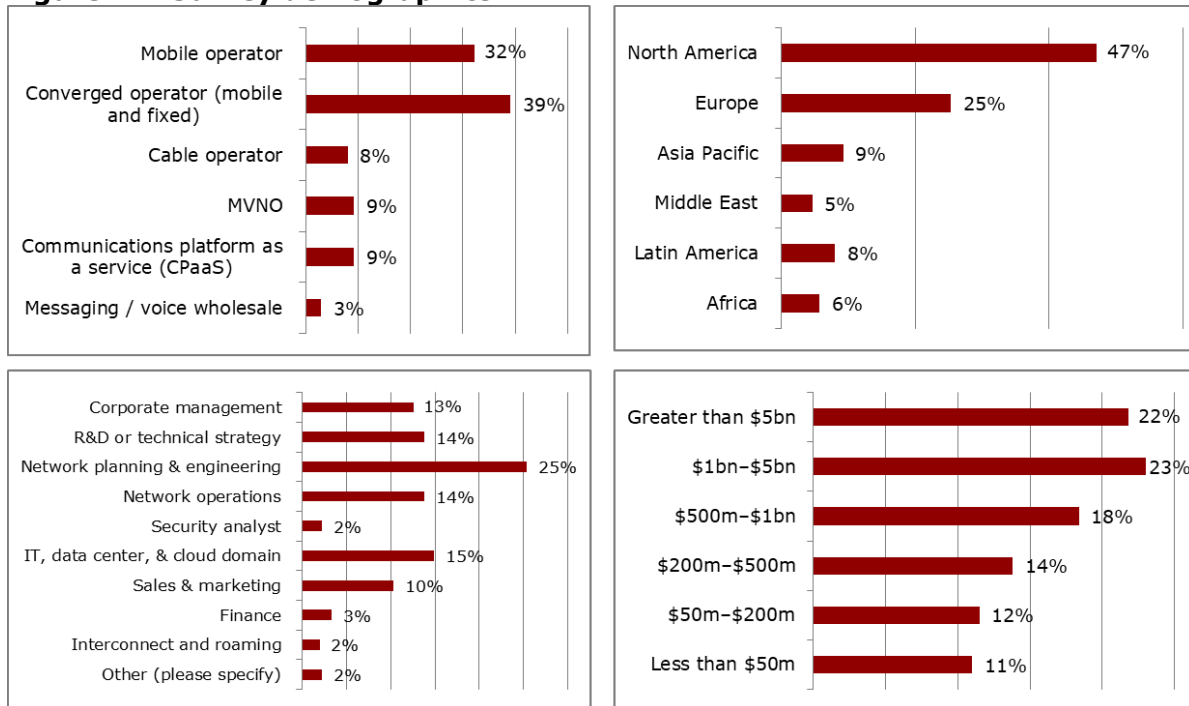
The final issue relates to the perceived high cost of cloud transformation. In this case, 61% of CSPs expressed concerns. While a 6 out of 10 metric is concerning, unlike the BSS input, Tier 2/3 CSPs displayed a much greater level of concern (75%) than their Tier 1 counterparts (41%), which somewhat softens the overall impact.

In summary, while 5G monetization barriers do exist, the survey inputs overall confirm that CSPs are strongly committed to their 5G transformation because they recognize 5G delivers significant network-related scalability and resilience gains while also enhancing their competitive agility. Consequently, Heavy Reading believes that CSPs of all sizes need to consider 5G network investment a strategic imperative as they rank short- and medium-term investment opportunities.

## APPENDIX A – SURVEY DEMOGRAPHICS

This Heavy Reading white paper is based on a web-based global survey of CSPs conducted in July 2022. Respondents were drawn from the network operator list of the Light Reading readership database. After reviewing and removing incomplete responses, 87 qualified responses remained. Survey demographics are provided in **Figure A1**.

**Figure A1: Survey demographics**



n=87

Source: Heavy Reading

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