The AST Industry Study is a program of research, which has the over-arching goal of providing an independent look at the current and future needs of issuers and shareholders, and to identify ways to best address those needs. This next-step Industry Study project provides an in-depth look at what corporate issuers need and want in technology including their ideas, industry trends and solutions.

April, 2018
Technology Study Results

Corporate Issuers Envision a New Age of Connection to Shareholders with Practical Applications of High Technology to Achieve Higher Levels of Accuracy and Speed through the Expertise of Services Providers.

Technological advances are changing the way the world does business. Blockchain, ubiquitous computing, wireless mesh networks, mobile devices, robotics and machine learning are just a few of the sea-change innovations coming onto the scene with small and sometimes large footprints. AST recognized that these new methodologies needed careful attention.

With so many new ways of working, where should services providers be concentrating their efforts? What innovations will provide meaningful improvement for the servicing of shareholders, corporations and society at large? These are the questions AST researchers worked to answer in this new, next-steps 2018 research study in AST's Industry Study series, which they began offering to the industry in 2014.

The study involved personal interviews and surveys with industry leaders, AST clients, non-clients and members of AST's Executive Advisory Council. More than 39 individuals provided in-depth commentary and insights into their needs and industry impacts. Additionally, the AST team used advanced statistical analysis to discover derived or subconscious understanding of the technology situation.

When asked to think about technology and its applications in the industry, the respondents visualized a world with seamless connection between the provider's customer service staff and themselves. They want to better understand a shareholder's situation and even emotional tone, perhaps actually hearing the conversation. Others envisioned interconnected computing power removing all the walls that block the flow of information from one system to another. Using a more open and easy-to-use web or internet presence, respondents asked for greater robustness, speed and ease, self-administration and a human interface.

While most respondents saw the vast potential, still others demurred and claimed not to be technology experts. For these executives and even the ones who play with the possibilities, the expectation is that services providers and their in-house technologist will determine which of the innovations will be most beneficial to achieve their goals.

The study was designed to determine which of the respondents needs and goals are most important in order to provide a road-map to prioritize technological development. Determining the starting and growth points for investment in changing modes of business technology is key.
Technology Study Results

Corporate Issuers’ Needs

The top rated needs where technological solutions should be applied include:

• Improve accuracy and reduce mistakes considering the human element at every level
• Provide a better experience and protection for shareholders.
• Serve the corporate issuers’ needs for information and reporting with ease and speed
• Respond to regulation changes for the shareholder’s and issuer’s benefit.
• Allow for greater information flow between systems and people for greater self-service and information discovery and use.

The researchers used standard analysis and advanced cluster and factor analysis to reduce the many areas studied into these five core features. Based on the respondents beliefs, every innovation being developed or technology adopted should be viewed or implemented from the vantage point of how it will improve or change for the better these five areas.

Beliefs about Technology

The vast majority of respondents believe that technology is complex and a different skill set from their own or managements. The highest scoring belief is that technology should be relayed to them in layman’s terms. They get questions regularly and need to provide answers even on technology that will be many years in development. They also believe technology is an investment that the provider should make to show their commitment to the business.

After reducing comments through analysis, the top scoring beliefs include:

• Complexity: Issuers believe technology is complex. They are relying on providers to keep them up-to-date with layman’s terms and understanding of high tech advancements, even if they are not as yet in the field.
• Technology: While not a strict requirement, creates preference for vendors. For example, mobile applications score relatively less strongly than other items; however, in further analysis, having mobility for the issuer’s themselves, can be a deal maker or breaker for brand selection.
• Confidence: Most respondents are confident that their providers and in-house staff are doing a good job in protecting shareholders and that innovation is adequate. Others are more fearful and lack confidence that current technology will provide the needed security.
• Sharing Data: Most believe that sharing data is imperative. However, the details of implementation are for providers to implement.
Technology Study Results

Technology & the Shareholders’ Experience

“Interface should be easy to navigate and options should be clear and succinct. Also, one of the biggest frustration that we frequently hear from our shareholders when calling in is that they have to press too many buttons to get to a live representative,” as one respondent noted.

The top rated areas of importance for the implementation of technology for the shareholders’ experience include:

- Greater ability for the shareholder to handle transactions or manage their accounts without assistance.
- Technology to avoid unnecessary escheatment of funds.
- Technology that makes it easier for the shareholder to communicate with the services provider.
- Email notification to the shareholder when there is activity on the account.
- Online assistance using a chat function.
- While mobile technology was rated lower than the top items, it should be noted that mobile applications were areas of provider differentiation and preference.

Data Safety and Security

While data safety and security were high-interest topics, many respondents believe that between their own in-house efforts and those of their providers, technology to protect shareholders from hackers and criminals were in good shape. Others had a lot of fear on this topic, particularly possible identity theft in light of the recent highly publicized release of information and privacy concerns surrounding consumer-centered businesses.

Respondents were most in support of service providers’ protections such as firewalls, encryptions, and any technology that would protect shareholders information. Service provider secure storage solutions were also rated highly.

While not rated as highly, there was moderate interest in shareholder education, webinars and newsletters. Most felt that emails would be a sufficient means to communicate changes to shareholders.
Corporate Issuer Experiences

Clearly, the management of their accounts in order to increase speed and accuracy are critical to issuers. The full report offers a great many suggestions on the practical applications of technology and ideas for improvements.

The top rated areas for the issuer experience include:

- More self-service capability for common requests
- Ability to request reports directly on the computer
- Greater ability for the Relationship Manager to gain access to needed information directly without consulting different coworkers
- Fewer "stove pipes" systems to improve communications (For example, connect the call center history file with the account file)

Email is deemed the most effective way to communicate with issuers, although they also expected a phone call from their Relationship Manager for significant changes or improvements. They want to feel confident that they have the best provider for them and notifications of all a provider is doing is actually helpful.

Technology and Data Analytics

The comments around this topic center on getting more information about what is available. Respondents also offered a variety of other ideas as to information or reporting they would be interested in. Some respondents had more meager needs and want simple, traditional services. When evaluating a list of suggested uses, historical analysis of data, peer and trend analysis, predictive analytics and shareholder demographic analysis scored highly. Because of the limited understanding of how many of these services can be used, services providers will need to educate users as to the benefits they can provide.

For More Information

The full report has additional details on the study for consideration. AST Industry Study Report summaries are available at www.astfinancial.com for your review. Comments and questions about the Industry Study program, ideas for future research or this technology study are invited.
The AST Industry Study is a multi-year program of research, which includes the development of a service requirements matrix, an industry evaluative index, in-depth study of performance excellence for Relationship Managers and now this extensive look at technology. This technology study is a more comprehensive look into ideas that were presented by issuers in the last Index survey.

In 2014, American Stock Transfer & Trust Company, LLC (AST), working with its Executive Advisory Council (EAC), established an industry-leading research program, the AST Industry Study, to provide insights about what is needed by issuers and provide a platform for issuers to share their ideas and experiences to support the development of optimum solutions.

Working with independent research administrator Vincent McCabe, Inc., AST designed this technology study to capture corporate issuer thoughts on technologies that improve the shareholder and issuer client experience, address data analytics and optimize data safety and security as well as to provide a platform to discuss ideas on current trends in technological innovation.

To support the development of excellence for the services provider industry overall, AST makes the results of its Industry Study reports available online at www.astfinancial.com. For more information, contact AST, CST or DF King.

On behalf of the researchers and developers at AST, we welcome your thoughts on this or future studies.
Technology Study Overview

Primary Goals

• To capture corporate issuer thoughts on technologies that improve the shareholder and issuer client experience, address data analytics and optimize data safety and security as well as to provide a platform to discuss ideas on current trends in technological innovation in the industry and business overall.

Overall Research Design

• A two-phase process was employed
  • Phase 1: Investigative – personal interviews with both clients and non-client corporate issuers.
  • Phase 2: Predictive – both personal interviews and a quantitative survey were included.

Sample:

• During the period January 15 and March 15, 2018, representing a cross-section of businesses and job titles, 39 individuals participated in the study.

• All the executives who participated are actively involved with services to their shareholders and their corporations and have responsibility for the selection of services providers.

• It should be noted that some respondents provided feedback but declined to provide information on the more complex aspects of the technology questions. They were interested in the improvements technology can bring but not on the specific technologies to be employed.

• Overall, the survey trended strongly with a high degree of concurrence among the participants. The study is statistically directional, providing descriptive analytics.
The technology study included seven major areas of study as follows:

<table>
<thead>
<tr>
<th>Areas of Study</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Top-of-Mind Uses</td>
<td>Respondents were asked, “What comes to mind first as an area that would benefit from the use of technology.”</td>
</tr>
<tr>
<td>2. Reasons for Technology</td>
<td>Respondents were asked to rate the importance of lists of reasons for developing technological solutions. The lists of reasons used in the survey were developed in the Phase 1 or personal interview aspect of the project.</td>
</tr>
<tr>
<td>3. Technology Beliefs</td>
<td>Respondents were asked to agree or disagree with a series of statements on the adoption and/or need for technology. The lists of reasons used in the survey were developed in the Phase 1 or personal interview aspect of the project.</td>
</tr>
<tr>
<td>4. Experience Shareholder</td>
<td>Respondents were asked, “What technologies should service providers be developing to improve the shareholder experience.” They also evaluated a variety of thoughts developed in Phase 1 and provided ideas on communications.</td>
</tr>
<tr>
<td>5. Data Safety &amp; Security</td>
<td>Respondents were asked, “What aspects of data safety and cyber security concern you most? They also evaluated a variety of thoughts developed in Phase 1 and provided ideas on communications.</td>
</tr>
<tr>
<td>6. Experience Corporate</td>
<td>Respondents were asked, “What do you think services providers should be doing in this area to support you? They also evaluated a variety of thoughts developed in Phase 1 and provided ideas on communications.</td>
</tr>
<tr>
<td>7. Data Analytics</td>
<td>Respondents were asked, “What do you think services providers should be doing in this area to support you? They also evaluated a variety of thoughts developed in Phase 1 and provided ideas on communications.</td>
</tr>
</tbody>
</table>
Respondents were asked: Q1. When you think about service providers' practices, what comes to mind first as an area that would benefit from improved use of technology?

Sample comments include:

- *The ability of issuers to see detailed notes of shareholder contacts -- the ability to listen to calls, see the notes taken by the operator, etc.*
- *Cybersecurity, data security, shareholder experience.*
- *Advanced and secure website; user friendly platform for both issuers and shareholders; accurate and value driven data reports that are also manipulative; maintenance of data integrity.*
- *Accessibility to custom reports by allowing end users to query against database for special data files.*
- *Automate communication between platforms, i.e., transfer agent and equity plans*
- *Having access to more documentation on the website.*
- *Easier to use website.*
- *Having a human interface on the web is helpful to some stockholders.*
- *Shareholder self help.*
- *Technology is not my thing. I rely on AST to provide me with up-to-date technology.*
- *I don't want to know a lot about the details of how these things work. I need enough to explain it to management. My in-house team is very good with keeping us up-to-date and safe.*
Respondents were asked: Q1. When you think about service providers’ practices, what comes to mind first as an area that would benefit from improved use of technology?

**Technology Uses – Top of Mind**

- When respondents were asked about the uses for technology without prompting, ideas about shareholder experience and shareholder interfaces came to mind first for the majority of respondents.
- Some respondents also commented that while technology was very important to them, they personally don’t know a lot about it and rely on service providers and in-house staff to keep them apprised of needed updates. They want sufficient information to explain technology but not detailed technical jargon.

**Note:** Will not add to 100% due to multiple comments
Findings – Reasons for Technology

Respondents were asked to rate the importance of the following reasons for developing technological solutions:

Q2. How important to you are each of the following reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

- Cost containment overall
- Improve safety & cyber security
- Fear of hacking or criminal attacks
- Improve service to my account
- Save time for me
- Improve response times
- Improve accuracy
- Reduce mistakes
- Improve the shareholder experience
- Support strategic decision making
- Advance warning of situations
- Respond to regulation changes

Q3. How important to you are each of these other reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

- Faster access to information I need
- Improve responsiveness to my requests
- Gain insights into shareholders demographic profiles
- Gain insights into shareholders behavior
- Make it easier for shareholders to get information they need
- Reduce the cost of servicing shareholders’ requests
- Make it easier for me to get reports I need
- Improve information flow between provider systems
- Automation of common requests
- Better communications with shareholders
- Improve communication with us
- Reduce mistaken escheatment
Findings – Reasons for Technology

Respondents were asked to rate the importance of the following reasons for developing technological solutions:

**Q2.** How important to you are each of the following reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Mean Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve accuracy</td>
<td>4.76</td>
</tr>
<tr>
<td>Reduce mistakes</td>
<td>4.71</td>
</tr>
<tr>
<td>Improve safety &amp; cyber security</td>
<td>4.71</td>
</tr>
<tr>
<td>Fear of hacking or criminal attacks</td>
<td>4.65</td>
</tr>
<tr>
<td>Respond to regulation changes</td>
<td>4.47</td>
</tr>
<tr>
<td>Improve the shareholder experience</td>
<td>4.47</td>
</tr>
<tr>
<td>Save time for me</td>
<td>4.47</td>
</tr>
<tr>
<td>Improve service to my account</td>
<td>4.47</td>
</tr>
<tr>
<td>Advance warning of situations</td>
<td>4.35</td>
</tr>
<tr>
<td>Improve response times</td>
<td>4.29</td>
</tr>
<tr>
<td>Cost containment overall</td>
<td>4.29</td>
</tr>
<tr>
<td>Support strategic decision making</td>
<td>4.00</td>
</tr>
</tbody>
</table>

**Q3.** How important to you are each of these other reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Mean Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make it easier for me to get reports I need</td>
<td>4.65</td>
</tr>
<tr>
<td>Make it easier for shareholders to get information they need</td>
<td>4.59</td>
</tr>
<tr>
<td>Improve communication with us</td>
<td>4.53</td>
</tr>
<tr>
<td>Improve responsiveness to my requests</td>
<td>4.53</td>
</tr>
<tr>
<td>Faster access to information I need</td>
<td>4.47</td>
</tr>
<tr>
<td>Automation of common requests</td>
<td>4.41</td>
</tr>
<tr>
<td>Reduce mistaken escheatment</td>
<td>4.29</td>
</tr>
<tr>
<td>Reduce the cost of servicing shareholders’ requests</td>
<td>4.24</td>
</tr>
<tr>
<td>Better communications with shareholders</td>
<td>4.24</td>
</tr>
<tr>
<td>Improve information flow between provider systems</td>
<td>4.18</td>
</tr>
<tr>
<td>Gain insights into shareholders behavior</td>
<td>3.35</td>
</tr>
<tr>
<td>Gain insights into shareholders demographic profiles</td>
<td>3.35</td>
</tr>
</tbody>
</table>
Findings – Reasons for Technology

Respondents were asked to rate the importance of the following reasons for developing technological solutions:

Q2. How important to you are each of the following reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Reason</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve accuracy</td>
<td>23.50%</td>
<td>76.50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of hacking or criminal attacks</td>
<td>11.80%</td>
<td>11.80%</td>
<td>76.50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve safety &amp; cyber security</td>
<td>5.90%</td>
<td>17.60%</td>
<td>76.50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce mistakes</td>
<td>29.40%</td>
<td>70.60%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Improve the shareholder experience</td>
<td>11.80%</td>
<td>29.40%</td>
<td>58.80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Save time for me</td>
<td>11.80%</td>
<td>29.40%</td>
<td>58.80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve service to my account</td>
<td>5.90%</td>
<td>41.20%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respond to regulation changes</td>
<td>52.90%</td>
<td>47.10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost containment overall</td>
<td>17.60%</td>
<td>35.30%</td>
<td>47.10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve response times</td>
<td>11.80%</td>
<td>47.10%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advance warning of situations</td>
<td>64.70%</td>
<td>35.30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support strategic decision making</td>
<td>17.60%</td>
<td>64.70%</td>
<td>17.60%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q3. How important to you are each of these other reasons for developing technology solutions. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Reason</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make it easier for me to get reports I need</td>
<td>35.30%</td>
<td>64.70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make it easier for shareholders to get information they need</td>
<td>5.90%</td>
<td>29.40%</td>
<td>64.70%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce mistaken escheatment</td>
<td>23.50%</td>
<td>23.50%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve communication with us</td>
<td>47.10%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation of common requests</td>
<td>11.80%</td>
<td>35.30%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve responsiveness to my requests</td>
<td>47.10%</td>
<td>52.90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faster access to information I need</td>
<td>52.90%</td>
<td>47.10%</td>
<td></td>
<td></td>
<td></td>
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<td>Better communications with shareholders</td>
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<td>35.30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce the cost of servicing shareholders' requests</td>
<td>11.80%</td>
<td>52.90%</td>
<td>35.30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain insights into shareholders behavior</td>
<td>41.20%</td>
<td>23.50%</td>
<td>17.60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain insights into shareholders demographic profiles</td>
<td>41.20%</td>
<td>29.40%</td>
<td>11.80%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Not at all Important  
2. Unimportant  
3. Neutral  
4. Important  
5. Very Important
To further understand the results concerning Reasons for Technology, the researchers applied factor and cluster analysis to see how the reasons of importance are correlated. The researchers discovered the following correlations and derived factors. In the minds of the respondents, these items from Q2 are correlated.

### Correlation of Reasons for Technology

<table>
<thead>
<tr>
<th>Shareholder Security</th>
<th>Service Me</th>
<th>Improve Accuracy</th>
<th>Regulation Monitoring for Shareholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of hacking or criminal attacks</td>
<td>Improve service to my account</td>
<td>Improve accuracy</td>
<td>Respond to regulation changes</td>
</tr>
<tr>
<td>Improve safety &amp; cyber security</td>
<td>Save time for me</td>
<td>Reduce mistakes</td>
<td>Improve the shareholder experience</td>
</tr>
<tr>
<td>Improve the shareholder experience</td>
<td>Improve response times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Factor Correlations

- Shareholder Security: 23.53%
- Service Me: 35.29%
- Improve Accuracy: 17.65%
- Regulation Monitoring for Shareholders: 17.65%
- Respondent Clusters: 5.88%

#### Respondent Clusters

1. Cluster 1: Accuracy is Good Now
2. Cluster 2: Service Me with Accuracy & Regulation
3. Cluster 3: Wants Accuracy & Regulation Monitoring
5. Cluster 5: Speedy Service for Me

The researchers applied cluster analysis to the derived factors in Q2 to determine if different respondents felt more strongly about some ideas than others. The researchers discovered the following correlations and derived clusters. Respondents related most strongly to different factors.
To further understand the results concerning Reasons for Technology, the researchers applied factor and cluster analysis to see how the reasons of importance are correlated. The researchers discovered the following correlations and derived factors. In the minds of the respondents, these items from Q3 are correlated.

### Factor Correlations

<table>
<thead>
<tr>
<th>Shareholder Focus</th>
<th>Speed of Access</th>
<th>Reduce Mistakes &amp; Improve Response</th>
<th>Information Flow and Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make it easier for shareholders to get information they need</td>
<td>Make it easier for me to get reports I need</td>
<td>Reduce (Avoid) mistaken escheatment</td>
<td>Improve information flow between provider systems</td>
</tr>
<tr>
<td>Gain insights into shareholders behavior</td>
<td>Faster access to information I need</td>
<td>Improve communication with us</td>
<td>Automation of common requests</td>
</tr>
<tr>
<td>Gain insights into shareholders demographic profiles</td>
<td>Improve responsiveness to my requests</td>
<td>Improve responsiveness to my requests</td>
<td></td>
</tr>
<tr>
<td>Reduce the cost of servicing shareholders' requests</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Respondent Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Description</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>More Flow &amp; Automation</td>
<td>5.88%</td>
</tr>
<tr>
<td>Cluster 2</td>
<td>More Service Shareholders</td>
<td>29.41%</td>
</tr>
<tr>
<td>Cluster 3</td>
<td>More Speed</td>
<td>11.76%</td>
</tr>
<tr>
<td>Cluster 4</td>
<td>Reduce Mistakes &amp; Communicate</td>
<td>29.41%</td>
</tr>
<tr>
<td>Cluster 5</td>
<td>Less Engaged in Tech</td>
<td>23.53%</td>
</tr>
</tbody>
</table>

The researchers applied cluster analysis to the derived factors in Q3 to determine if different respondents felt more strongly about some ideas than others. The researchers discovered the following correlations and derived clusters. Respondents related most strongly to different factors.
Findings – Technology Beliefs

Respondents were asked to rate the importance of the following reasons for developing technological solutions:

Q4. Read each statement below and indicate your disagreement or agreement with each of the statements. 1 means disagree strongly and 5 means agree strongly.

- Technology is an investment that the provider should make to show their commitment to our business.
- The availability of technology influences my decision to select one vendor over another.
- Services providers should routinely update me on technologies they are employing in my behalf.
- I need to know about technology in layman's terms so I can quickly inform management should questions arise.
- I like to know about technologies from my provider before I read about them in the media.
- I am confident that my services providers have the latest technology for data safety and security.
- I am not concerned about specific technology but rather want to know it provides a solution or improvement.
- Mobile technology is critically important for my use to manage my business with the provider.
- Mobile technology is critically important for my shareholders to use.
- I expect the services providers to investigate machine learning solutions.
- I would like to see Service Providers internal systems be more connected and share data.
- My own company is doing an excellent job in data safety and security.
Respondents were asked to indicate their disagreement or agreement with a variety of hypotheses concerning technology:

Q4. Read each statement below and indicate your disagreement or agreement with each of the statements. 1 means disagree strongly and 5 means agree strongly.

<table>
<thead>
<tr>
<th>Findings – Technology Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need to know about technology in layman's terms so I can quickly inform management should questions arise.</td>
</tr>
<tr>
<td>I would like to see Service Providers internal systems be more connected and share data.</td>
</tr>
<tr>
<td>Technology is an investment that the provider should make to show their commitment to our business.</td>
</tr>
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<tr>
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<tr>
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</tr>
<tr>
<td>Mobile technology is critically important for my use to manage my business with the provider.</td>
</tr>
</tbody>
</table>
Findings – Technology Beliefs

Respondents were asked to indicate their disagreement or agreement with a variety of hypotheses concerning technology:

Q4. Read each statement below and indicate your disagreement or agreement with each of the statements. 1 means disagree strongly and 5 means agree strongly.

<table>
<thead>
<tr>
<th>Statement</th>
<th>% Respondent Scoring Each Level of Disagreement or Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need to know about technology in layman's terms so I can quickly inform management should questions arise.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>I would like to see Service Providers internal systems be more connected and share data.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>Technology is an investment that the provider should make to show their commitment to our business.</td>
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</tr>
<tr>
<td>I am not concerned about specific technology but rather want to know it provides a solution or improvement.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>Services providers should routinely update me on technologies they are employing in my behalf.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>The availability of technology influences my decision to select one vendor over another.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>Mobile technology is critically important for my shareholders to use.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>I like to know about technologies from my provider before I read about them in the media.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>My own company is doing an excellent job in data safety and security.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>I expect the services providers to investigate machine learning solutions.</td>
<td>![Graph showing respondent scoring]</td>
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<tr>
<td>I am confident that my services providers have the latest technology for data safety and security.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
<tr>
<td>Mobile technology is critically important for my use to manage my business with the provider.</td>
<td>![Graph showing respondent scoring]</td>
</tr>
</tbody>
</table>

1 - Strongly Disagree  2 - Disagree  3 - Neutral  4 - Agree  5 - Strongly Agree
To further understand the results concerning Technology Beliefs, the researchers applied factor and cluster analysis to see how the reasons of importance are correlated. The researchers discovered the following correlations and derived factors. In the minds of the respondents, these items from Q4 are correlated.

Factor Correlations

Proactive Provider Needed
- I like to know about technologies from my provider before I read about them in the media.
- I need to know about technology in layman's terms so I can quickly inform management should questions arise.
- Services providers should routinely update me on technologies they are employing in my behalf.
- Technology is an investment that the provider should make to show their commitment to our business.

Mobility Creates Preference
- Mobile technology is critically important for my shareholders to use.
- The availability of technology influences my decision to select one vendor over another.
- Mobile technology is critically important for my use to manage my business with the provider.

Confident in Investment in Data Security
- I am confident that my services providers have the latest technology for data safety and security.
- My own company is doing an excellent job in data safety and security.
- Technology is an investment that the provider should make to show their commitment to our business.

Robust Technology for Me
- I would like to see Service Providers internal systems be more connected and share data.
- Mobile technology is critically important for my use to manage my business with the provider.

The researchers applied cluster analysis to the derived factors in Q4 to determine if different respondents felt more strongly about some ideas than others. The researchers discovered the following correlations and derived clusters. Respondents related most strongly to different factors.
Respondents were asked an open-ended question to obtain top-of-mind comments:

Q5. What technologies or service augmentation should service providers be developing to improve the shareholder experience?

Sample comments include:

- Improve and enhance the mobile experience
- Allowing easy access to a human for assistance.
- Systems talking between each other, solutions for enhancing shareholder experience …
- Interface should be easy to navigate and options should be clear and succinct. Also, one of the biggest frustration that we frequently hear from our shareholders when calling in is that they have to press too many buttons to get to a live representative. Options should be limited and not convoluted.
- Mobile options with intuitive/ease of site navigation.
- Mobile access that is clear and secure. Not clumsy.
- Service update -- where are requests to remove restrictions or transfer shares in the process and what is the timing for completion.
- Easier access to account information for shareholders, including 1099 information.
Findings – Technology & Shareholders’ Experience

Respondents were asked to rate the importance of a variety of concepts around Shareholders’ Experience technological enhancements:

Q6. How important to you is the development of the following technologies to improve shareholder management. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

- Multifactor authentication.
- Email notification to the shareholder when there is activity on the account
- Mobile technology for the shareholder to use
- Greater ability for the shareholder to handle transactions or manage their accounts without assistance
- Online assistance using a chat function
- Technology that makes it easier for the shareholder to communicate with the services provider
- Technology that allows me to track the activity the shareholder experienced so we can be better informed in handling a situation
- Create the ability for the company to re-set a shareholders account should the shareholder lose his passwords, etc.
- Technology to avoid unnecessary escheatment of funds
- Notification to a shareholder about activity on his/her accounts
- Artificial Intelligence (AI) in shareholder services
Respondents were asked to rate the importance of a variety of concepts around Shareholders’ Experience technological enhancements.

Q6. How important to you is the development of the following technologies to improve shareholder management. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

**Mean Scores**

- Greater ability for the shareholder to handle transactions or manage their accounts without assistance: 4.41
- Technology to avoid unnecessary escheatment of funds: 4.35
- Technology that makes it easier for the shareholder to communicate with the services provider: 4.29
- Email notification to the shareholder when there is activity on the account: 4.29
- Online assistance using a chat function: 4.24
- Notification to a shareholder about activity on his/her accounts: 4.18
- Technology that allows me to track the activity the shareholder experienced so we can be better informed in handling a…: 3.88
- Mobile technology for the shareholder to use: 3.88
- Multifactor authentication: 3.88
- Artificial Intelligence (AI) in shareholder services: 3.18
- Create the ability for the company to re-set a shareholders account should the shareholder lose his passwords, etc.: 3.06
Findings – Technology & Shareholders’ Experience

Respondents were asked to rate the importance of a variety of concepts around Shareholders’ Experience technological enhancements.

Q6. How important to you is the development of the following technologies to improve shareholder management. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

% Respondents

- Greater ability for the shareholder to handle transactions or manage their accounts without assistance: 011.80% 35.30% 52.90%
- Technology to avoid unnecessary escheatment of funds: 011.80% 41.20% 47.10%
- Technology that makes it easier for the shareholder to communicate with the services provider: 0 35.30% 47.10%
- Email notification to the shareholder when there is activity on the account: 0 35.30% 47.10%
- Online assistance using a chat function: 0 41.20% 41.20%
- Technology that allows me to track the activity the shareholder experienced so we can be better informed in handling a situation: 89.00% 29.40% 35.30% 29.40%
- Notification to a shareholder about activity on his/her accounts: 89.00% 70.60% 23.50%
- Mobile technology for the shareholder to use: 0 29.40% 52.90% 17.60%
- Multifactor authentication: 0 29.40% 52.90% 17.60%
- Artificial Intelligence (AI) in shareholder services: 011.80% 58.80% 29.40% 0
- Create the ability for the company to re-set a shareholders account should the shareholder lose his passwords, etc.: 59.00% 41.80% 52.90% 29.40% 0

1 - Not at all Important 2 - Unimportant 3 - Neutral 4 - Important 5 - Very Important
Q7. How should services providers communicate with shareholders to advise them of technology changes or other situations?

Sample Comments include:

- Via email
- Through the company (issuer).
- Email or insert in quarterly statements.
- Either traditional mailing or electronic mail.
- This is only necessary if it changes the shareholder's use of the technology. Otherwise it is just a courtesy.
- Email alone.
- Phone and e-mail.
- As many ways as possible, mail, phone, email.
- Email (or regular mail for shareholders with no working email address).
- Email or text.
Findings – Data Safety & Security

Respondents were asked an open-ended question to obtain top-of-mind comments:

Q8. What aspects of data safety and cyber security concern you most?

- Accounts being secure.
- Identity theft, financial identity fraud.
- Cyberbridge
- Identity theft as a result of a breach in cyber security.
- Protection of data and verification, i.e., risk that data used by technology solutions is timely and accurate.
- Hacking
- Data breach, hacking
- Breach of personal information that can result in ID theft.
- Privacy of shareholder account information including social security information.
Findings – Data Safety & Security

Respondents were asked:
Q9. How important to you is the development of the following technologies for data safety and security. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Service Provider Secure Storage Solutions</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block Chain Technology</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Provider Protections such as Firewalls, Encryption, etc.</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.53</td>
</tr>
</tbody>
</table>

Respondents were asked:
Q10. How important to you is the development of the following services for data safety and security. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Education to Help Shareholders Understand Ways to Protect Themselves</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Webinars and Education Sessions to Learn What You or Your Company Can Do to Keep Your Data Safe</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.76</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Newsletters with Technology Update Information</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.71</td>
</tr>
</tbody>
</table>
Findings – Data Safety & Security

Respondents were asked:
Q9. How important to you is the development of the following technologies for data safety and security. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

Respondents were asked:
Q10. How important to you is the development of the following services for data safety and security. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.
Respondents were asked an open-ended question to obtain top-of-mind comments:

Q11. Are there any other technologies or ideas that you think are important that would improve data safety and cyber security?

No other comments were provided.
Findings – Corporate Issuers’ Experience

Respondents were asked:
Q12. What technologies or service augmentations should service providers be developing to improve its service to you?

Sample comments include:

- Improve mobile experience.
- Always looking at ways to improve access to records.
- Should be able to access accounts and generate reports using the same web browser. Server speed is not consistent.
- Report size seems unreasonably large. Need to reduce them so that more data can fit into one page, e.g., General Account page of a shareholder account.
- Accessibility to custom reports by allowing end users to query against database for special data files.
- MS Excel download file that I can create based on criteria I select from a broad menu of data fields AST already has.
- Reports downloadable in excel (i.e. shareholder report)
- A way of tracking requests to remove restrictions on shares -- too many times these instructions are missed or not correctly carried out and I often do not find this out until a shareholder complains of bad service.
Respondents were asked:

Q13. How important to you is the development of the following technologies for the management of your experience with the services provider. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

- Ability to request reports directly on the computer
- More self-service capability for common requests
- Fewer "stove pipes" systems to improve communications (For example, connect the call center history file with the account file)
- Greater ability for the Relationship Manager to gain access to needed information directly without consulting different coworkers
- Mobile app for me to use to communicate with the services provider
- Technology to provide information about regulatory change
- Updates on escheatment policy changes
- Provide more information on individual calls at the call center to better interpret the emotional tone of the contact.
- Reports on call center activity the provide higher levels of detail
Findings – Corporate Issuers’ Experience

Respondents were asked:
Q13. How important to you is the development of the following technologies for the management of your experience with the services provider. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>More self-service capability for common requests</td>
<td>4.47</td>
</tr>
<tr>
<td>Ability to request reports directly on the computer</td>
<td>4.47</td>
</tr>
<tr>
<td>Greater ability for the Relationship Manager to gain access to needed information directly without consulting different…</td>
<td>4.35</td>
</tr>
<tr>
<td>Fewer “stove pipes” systems to improve communications (For example, connect the call center history file with the…</td>
<td>4.18</td>
</tr>
<tr>
<td>Reports on call center activity the provide higher levels of detail</td>
<td>4.00</td>
</tr>
<tr>
<td>Updates on escheatment policy changes</td>
<td>4.00</td>
</tr>
<tr>
<td>Technology to provide information about regulatory change</td>
<td>3.76</td>
</tr>
<tr>
<td>Provide more information on individual calls at the call center to better interpret the emotional tone of the contact.</td>
<td>3.65</td>
</tr>
<tr>
<td>Mobile app for me to use to communicate with the services provider</td>
<td>3.12</td>
</tr>
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</table>
Respondents were asked:
Q13. How important to you is the development of the following technologies for the management of your experience with the services provider. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

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- Reports on call center activity that provide higher levels of detail
- Updates on escheatment policy changes
- Provide more information on individual calls at the call center to better interpret the emotional tone of the contact.
- Technology to provide information about regulatory change
- Mobile app for me to use to communicate with the services provider
Findings – Corporate Issuers’ Experience

Respondents were asked:

Q14. When a services provider makes a technological improvement or change, how should they communicate this change to you?

- Email or phone call from Relationship Manager
- Email is just fine.
- Monthly newsletter via email
- Technology specific notification via email
- Email high level description with more in depth webinar that can be accessed as desired
- Email and direct phone call from CRM if significant improvement or change
Respondents were asked:
Q15. Service providers are capturing a great deal of data, which can be analyzed to develop various insights. What do you think services providers should be doing in this area to support you?

Sample comments include:

- *Showing me trends that I may not be aware of.*
- *Sharing info whenever possible.*
- *Reports have filter options that we can narrow for specific projects; and different types of reports should be more accessible in real time.*
- *Better knowledge pertaining to accounts that may become escheated property because shareholder is deceased. Run query against specialized databases?*
- *Provide reporting on call center stats error reporting analysis and recommendations for error reduction market comparison of the above 2 reportings*
- *Honestly, we just want excellent basic stock transfer services.*
- *Allowing my participants to opt out of any information sharing by the service provider*
Respondents were asked:

Q16. How important to you is the development of the following services. Use a scale of 1 to 5, where 1 is not at all important and 5 is very important.

<table>
<thead>
<tr>
<th>Service</th>
<th>Mean Score</th>
<th>% Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical analysis of data</td>
<td>4.00</td>
<td>29.40% 41.20% 29.40%</td>
</tr>
<tr>
<td>Peer and trend analysis</td>
<td>3.76</td>
<td>90% 29.40% 47.10% 17.60%</td>
</tr>
<tr>
<td>Predictive analytics for Proxy voting</td>
<td>3.76</td>
<td>5.90% 41.20% 29.40% 17.60%</td>
</tr>
<tr>
<td>Shareholder demographic analysis</td>
<td>3.76</td>
<td>11.80% 35.30% 35.30% 17.60%</td>
</tr>
<tr>
<td>Shareholder behavior analysis</td>
<td>3.59</td>
<td>90% 23.50% 58.80% 11.80%</td>
</tr>
<tr>
<td>Predictive analytics for shareholder behavior</td>
<td>3.47</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</td>
</tr>
</tbody>
</table>
For more information, visit
American Stock Transfer & Trust Company, LLC
at www.astfinancial.com or call/email your
Relationship Manager at AST, CST or DF KING

Study Administrator:
Vincent McCabe, Inc.
Contact Jean Vincent at 315 685-7227
jean@vincentmccabe.com