

Impact of the Ontario Brain Institute

By
The Evidence Network Inc.

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The
Evidence
Network



**The
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Network**

Provided under contract to The Ontario Brain Institute (OBI)

By

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Executive Summary

In 2021, The Evidence Network Inc. (TEN) conducted an impact assessment to determine the impact of the Ontario Brain Institute (OBI) and the Integrated Discovery Programs (IDPs) they facilitate on stakeholders. OBI engages researchers, companies, and community organizations that derive benefit from improvements to their knowledge, their ability to effect change in the neuroscience ecosystem, expand their networks, and receive funding for continuing research and development.

The analysis indicated that, overall, stakeholders attributed OBI with substantive impact on improvements to their resources and capabilities, and performance. Furthermore, we found that the shorter-term impact OBI has on the stakeholders' resources and capabilities is related to the attribution of impact on performance in the longer-term. This strongly suggests that the OBI model is working to advance the neuroscience ecosystem.

Of particular note is the important role that OBI plays in enabling researchers to design multi-dimensional research projects, and conduct research with other researchers, as well as publish in high-impact journals, and promote and disseminate their research results; ultimately improving the visibility and uptake of their research.

Additionally, of note is OBI's impact on the promotion opportunities and knowledge of companies, as well as the market valuation, investments received and degree of innovation of companies.

We also found that OBI is having a meaningful impact on the ability of community organizations to increase the sustainability and scale of community-led programs, influence neuroscience research, collaborate with researchers, improve their knowledge base, and collaborate with other not-for-profit or neurological charities, as well as their ability to attract funding.

Eighty-nine percent (89%) of respondents indicated it would have been difficult to access similar support elsewhere, suggesting that OBI's programs and activities have little overlap with other providers in the region. This finding, coupled with the attribution of impact seen throughout the assessment, indicates that OBI is meeting the needs of stakeholders in the region. Further, 80% of respondents reported that they are very satisfied, or satisfied with their relationship with OBI, and 94% found their engagement with OBI's network to have been very valuable, or valuable. This speaks to the quality of OBI's connections within the neuroscience sphere, and their ability to facilitate connections between their various stakeholders.

The assessment identified two opportunities for improvement: (1) Facilitate additional collaborations, and (2) increase awareness of Brain-CODE amongst companies.

Overall, the impact assessment findings demonstrate that OBI is producing results, and positively impacting stakeholders in an effort to elevate Ontario as a world leader in brain discovery, commercialization, and care.



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Introduction

Report Structure

We have created this report as Part 1 of four parts. In this report we present a summary of the results from our in-depth impact assessment of the Ontario Brain Institute (OBI). Parts 2, 3 and 4 are separate companion reports in which we present detailed analyses and diagrams for companies, community organizations, and researchers, respectively. Please refer to Parts 2, 3 and 4 for additional information on all findings presented in this report.

The Evidence Network Inc.

The Evidence Network Inc. (TEN) is an independent third-party company that focuses on assessing the impact of organizations or programs that support business, research, innovation, and entrepreneurship. TEN knows of no other company with both a methodology and a depth of expertise that is focused solely on the systematic assessment of the impact of innovation intermediaries.

The Ontario Brain Institute

The Ontario Brain Institute (OBI) is a provincially-funded, not-for-profit research centre seeking to maximize the impact of neuroscience and establish Ontario as a world leader in brain discovery, commercialization and care. Convergent partnerships are created between researchers, clinicians, industry, patients, and their advocates to foster discovery and deliver innovative products and services that improve the lives of those living with brain disorders. OBI funds and manages six Integrated Discovery Programs (IDPs) that focus on different areas of brain health. Each program collects various types of data, including genetic, molecular, imaging and behavioural, which are stored on OBI's state-of-the-art informatics platform, Brain-CODE, allowing for standardized data to be shared across Ontario.

TEN has conducted independent impact assessments for OBI previously, in 2015 and 2017. OBI once again engaged TEN in 2021 to produce an independent assessment of its impact on stakeholders.

TEN's Methodology

Approaches to assessing the results of investments in innovation intermediaries range from state-of-the-art evaluation methodologies, to substitutes for evaluations such as 'success stories'. State-of-the-art evaluation methodologies are highly rigorous but are very demanding in terms of data requirements. As a consequence, they are rarely feasible and are used infrequently outside of academia. The most frequently used approaches used in place of evaluations

include success stories, the presentation of firm performance data, the presentation of client satisfaction data, and economic impact analyses, which are attempts to estimate the total impact of interventions on the GDP of a region.

Between these two extremes are other methodologies that are both reliable and feasible. Such approaches include matched sample approaches, which seek to identify differences in the performance of treated and untreated firms, and surveys, which rely upon the expert judgement of survey respondents to distinguish between those performance differences attributable to interventions, and those that would have happened in the absence of interventions.

At the core of the methodology employed in this assessment is the attribution of impact - impact directly attributable to the work of innovation intermediaries. We capture this by relying on the aforementioned expert judgement of organizational representatives engaging with the venture support programs to determine the impact of the program being assessed. This results in defensible impact data that innovation intermediaries can confidently claim as their true impact on the clients they serve. To our knowledge, no other assessors systematically use the concept of attributed impact in their assessments of innovation intermediaries.

TEN measures the intensity of use of support services, and the short- and medium-term impacts of innovation intermediaries.

Impact on resources and capabilities (for example, skills, knowledge, and business linkages acquired) is the short-term impact of innovation intermediaries. Impact on performance (such as jobs, revenue, investment, publications, etc.) is the medium-term impact of innovation intermediaries. To accurately assess impact on client performance, TEN considers both the change in client performance and the degree to which the change is attributable to the intermediary.

The achievement of longer-term, or ultimate, socio-economic impact depends on the achievement of impacts on client performance, which originates from the achievement of shorter-term impacts on clients' resources and capabilities.

Survey Response Rates

From September to November 2021, 30 out of 41 companies, 19 out of 24 community organizations, and 93 out of 134 researchers that had engaged with OBI responded to a web-based survey developed by TEN, for response rates of 73%, 79%, and 69% respectively.

Profile of Respondents

OBI engages three key stakeholder groups: companies, community organizations, and researchers. The following presents summaries of the profiles of each of these groups.

Companies

Based on the survey responses, the companies that engage with OBI are primarily small, young, specialized biotech companies, located in Toronto, that have engaged with OBI in more recent years. Specifically, the analysis of the demographics and performance of companies that have engaged with OBI revealed the following.

- 40% are micro companies and 37% are start-ups
- 83% engaged in the ONtrepreneurs program
- 50% first engaged with OBI in 2019 – 2021, and 60% most recently engaged with OBI in 2021
- 79% were founded in 2013 - 2018
- 48% are pre-revenue
- 55% have headquarters located within Toronto proper
- 24% operate in the Biotechnology sector
- 45% have a market valuation within the \$5 million - \$19.9 million range
- 72% invest \$100K - \$999K annually in R&D or clinical trials

Further, these companies have made notable advancements in their performance since March 2017. Specifically:

- 52% increased their market valuation by more than 100%
- 59% received investments of \$1 million or more
- 43% acquired 100% of their new customers
- 40% increased employment by more than 100%
- 47% increased annual revenues by 100% or more
- 83% invested 60% or more of their expenditures in R&D or clinical trials
- 73% have applied for patents

Additionally, 83% of respondents indicated their company is at the internationally advanced level of innovativeness, or is an international leader in innovativeness. Further, 38% of respondents indicated their company's time to market is less than three years.

Community Organizations

Based on the survey responses, the community organizations that engage with OBI are primarily older organizations located in Toronto, that have engaged with OBI in more recent years, and have engaged in the GEEK program. Specifically, the analysis of the demographics and performance of the community organizations participating in the programs and activities provided by OBI revealed the following.

- 33% first engaged with OBI in 2019 or 2020
- 100% most recently engaged with OBI in 2021
- 39% were founded in 1982 or earlier
- 56% have headquarters located in Toronto proper
- 65% engaged in the GEEK program

Further, these organizations have made notable advancements in their performance since March 2017. Specifically:

- 65% received funding of \$1 million or more
- 53% developed 3 to 5 new or improved services
- 53% introduced new treatments or tools
- 38% influenced 1 or 2 guidelines or policies

Researchers

Based on the survey responses, the researchers that have engaged with OBI are primarily clinical researchers that first engaged with OBI in earlier years. Specifically, the analysis of the demographics and performance of researchers that have engaged with OBI revealed the following:

- 73% engaged as clinical researchers
- 44% first engaged with OBI in 2010 – 2012
- 91% most recently engaged with OBI in 2021

Further, these researchers have made notable advancements in their performance since March 2017. Specifically:

- 52% received investments of \$1 million or more
- 60% submitted more than 10 papers for publications or conferences
- 22% made invention disclosures
- 12% applied for patents
- 63% received 1 to 5 awards
- 32% developed 1 or 2 new treatments
- 40% developed 1 or 2 new or improved tools and technologies
- 36% influenced 1 or 2 new healthcare guidelines, policies, or regulations
- 33% influenced 1 or 2 new technology platform guidelines, policies, or regulations

Impact Assessment Highlights

The programs and activities provided by OBI positively impact the resources and capabilities of stakeholders. This impact, in turn, drives outcomes for:

- Improved stakeholder knowledge
- Network expansion
- Stakeholder performance

Stakeholder Engagement in Programs and Activities

Based on TEN's methodology, the programs, support services and activities provided by OBI directly impact stakeholders' resources and capabilities, which in

“The staff and executives at OBI have been very supportive and our relationship is deepening now through projects involving Brain-CODE.”

- Company Respondent

turn lead to impacts on stakeholder performance, and eventually to long-term impacts in the form of socio-economic benefits. As such, stakeholder engagement in the programs, support services and activities offered by OBI is critical to its long-term impact. The Integrated Discovery Programs (IDPs) offered

through OBI are: the Childhood Cerebral Palsy Integrated Neuroscience Discovery Network (CP-NET), the Epilepsy Research Program of the Ontario Brain Institute (EpLink), the Province of Ontario Neurodevelopmental Disorders Network (POND), the Canadian Biomarker Integrated Network in Depression (CAN-BIND), the Ontario Neurodegenerative Disease Research Initiative (ONDRI), and the Concussion Ontario Network: Neuroinformatics to Enhance Clinical Care and Translation (CONNECT).

The activities offered by OBI fall into three categories: outreach activities, industry relations initiatives (business development and partnerships for companies), and Brain-CODE (Centre for Ontario Data Exploration).

Companies

The percentages of company respondents that indicated engagement in the programs offered by OBI are as follows¹:

- ONtrepeneurs Program – 83%
- NERD Program – 47%
- Internship Program – 13%

The percentages of company respondents that indicated engagement in the activities offered by OBI are as follows:

Outreach Activities

- Communication and promotion – 83%
- Knowledge translation and exchange opportunities – 63%
- IDP workshops and cross-IDP dialogue – 37%
- Partnerships initiatives – 33%
- Engagement initiatives – 29%
- Patient Advisory Committee workshops and meetings – 20%

Company engagement in the communication and promotion activities is notably high, indicating that companies see value in leveraging OBI's channels (i.e., social media, websites, public talks, videos, newsletters, media releases and events) to promote and communicate their work, since OBI has a strong reputation as an evidence-based organization that shares credible information on brain health.

Business Development and Partnerships

- Networking and events – 84%
- Industry partnership opportunities – 90%
- Commercialization advice – 86%
- Contacts facilitated with either public or private investors – 83%

Again, the high percentage of companies participating in the networking opportunities and events indicates a strong desire for companies to attend events such as workshops, seminars, information sessions, and expos to connect with others and share their innovations. However, it should be noted that this has decreased from 96% in the 2017 assessment. This may be due to the effects of the pandemic or may indicate saturation in networking opportunities.

¹ Note that for all program and activity engagement questions, respondents were invited to select all that apply. Therefore, the cumulative percentage exceeds 100% for these results.

Community Organizations

The percentages of community organization respondents that indicated engagement in the activities offered by OBI are as follows²:

Outreach Activities

- Communication and promotion – 89%
- Knowledge translation and exchange opportunities – 83%
- Patient Advisory Committee workshops and meetings – 77%
- Partnerships initiatives – 56%
- Engagement initiatives – 44%
- IDP workshops and cross-IDP dialogue – 39%

The high percentage of community organizations engaged in the communication and promotion opportunities and the knowledge translation and exchange opportunities indicates that many community organizations are making use of OBI's social media platforms and its website, public talks (e.g., The Wellness Series), videos, newsletters (e.g., Brainnovations), media releases and events, and are involved in such things as provincial guideline and toolkit creation, policy round tables, and the Knowledge Translation-Communications Consortium. This is encouraging as it demonstrates the willingness of community organizations to keep apprised of the goings-on within the neuroscience ecosystem.

Industry Relations Initiatives³

- Partnerships with clinicians or researchers – 78%
- Networking and events – 67%
- Partnerships with patient communities or healthcare advocates – 61%
- Partnerships with companies – 34%
- Contacts facilitated with public or private investors – 34%

The high percentage of community organizations participating in the partnership opportunities, specifically with clinicians, researchers, patient communities and healthcare advocates indicates that most derive value from such connections. Of note is that participation in networking and events is up to 67% in 2021 from 44% in the 2017 assessment, indicating a significant uptake in these initiatives and signalling greater involvement of community organizations within the neuroscience ecosystem.

² Note that for all program and activity engagement questions, respondents were invited to select all that apply. Therefore, the cumulative percentage exceeds 100% for these results.

³ Industry relations initiatives are not solely initiatives with companies, but include initiatives with various stakeholder groups within the neuroscience ecosystem.

Researchers

The percentages of researchers that indicated engagement in the IDPs offered by OBI are as follows⁴:

- Province of Ontario Neurodevelopmental Disorders Network (POND) – 30%
- Ontario Neurodegenerative Disease Research Initiative (ONDRI) – 24%
- OBI Epilepsy Program (EpLink) – 22%
- Canadian Biomarker Integrated Network in Depression (CAN-BIND) – 22%
- Childhood Cerebral Palsy Integrated Neuroscience Discovery Network (CP-NET) – 21%
- The Concussion Ontario Network: Neuroinformatics to Enhance Clinical Care and Translation (CONNECT) – 4%

The percentages of researchers that indicated engagement in the activities offered by OBI are as follows:

Outreach Activities

- Communication and promotion – 84%
- IDP workshops and cross-IDP dialogue – 77%
- Knowledge translation and exchange opportunities – 75%
- Engagement initiatives – 63%
- Patient Advisory Committee workshops and meetings – 63%
- Partnerships initiatives – 41%

Researcher participation in the communication and promotion activities is notably high. This indicates a strong desire for researchers to connect with others through social media, websites, public talks, videos, newsletters, media releases, and events.

Industry Relations Initiatives⁵

- Networking and events – 86%
- Industry partnership opportunities – 43%
- Contacts facilitated with either public or private investors – 40%
- Commercialization advice – 37%

Again, the high percentage of researchers participating in the networking opportunities and events indicates a strong desire for researchers to attend

⁴ Note that for all program and activity engagement questions, respondents were invited to select all that apply. Therefore, the cumulative percentage exceeds 100% for these results.

⁵ Industry relations initiatives are not solely initiatives with companies, but include initiatives with various stakeholder groups within the neuroscience ecosystem.

workshops, seminars, information sessions, and expos to connect with industry players and share their research. Of note is the decrease in the percentage of researchers engaging in commercialization advice, down to 37%, from 50% in the 2017 assessment. This is likely due to fewer researchers currently looking to commercialize their research and does not necessarily indicate a lack of awareness of, or interest in, these services.

Brain-CODE

Brain-CODE (Centre for Ontario Data Exploration) is OBI's state-of-the-art neuroinformatics platform designed to store, manage and analyze data - a "shared brain" for researchers in Ontario and beyond, allowing scientists, clinicians, and industry to work together with this rich store of data in powerful new ways to enable breakthroughs in brain-related healthsecure informatics platform. It is primarily used by researchers. Fifty-seven percent (57%) of researcher respondents reported satisfaction with Brain-CODE.

The survey was designed to capture the engagement of researchers in the various capabilities of Brain-CODE:

- Brain-CODE: data storage – 82% of researchers indicated engagement
- Brain-CODE: data sharing – 74%
- Brain-CODE: analytical capacity – 59%
- Brain-CODE: linkages to external databases – 48%

Overall, engagement in Brain-CODE has remained fairly consistent since the 2017 assessment and follows the same trend in terms of the hierarchy of engagement (data storage, followed by data sharing, then analytical capacity, and finally linkages). The high percentage of researchers using the data storage capabilities of Brain-CODE is an important indicator of the confidence that researchers have in the platform to securely store their data. Additionally, the high percentage of researchers using the data sharing functionality of Brain-CODE indicates collaboration with other researchers, which will ultimately lead to more well-rounded research projects and more robust research results. The lower relative percentage of engagement for the analytical capacity component of Brain-CODE is likely due to the fact that OBI is still building out the analytical capabilities of Brain-CODE, and its current engagement is with more data generators than data users. However, it should be noted that analytical capacity engagement has increased from 54% in the 2017 assessment. Engagement in the linkages to external databases component has decreased slightly (down from 54% in 2017).

Companies also have access to Brain-CODE, however, only three out of the 30 company respondents (10%) indicated that they used Brain-CODE. This has decreased from 25% in the 2017 assessment. In general, low company

engagement with Brain-CODE is to be expected, as the informatics platform is primarily geared towards researchers. However, it is important to note that 43% of companies plan to use Brain-CODE in the future. Of the three company respondents indicated they had made use of Brain-CODE, one reported they were very satisfied, and the remaining two indicated they were neither satisfied nor dissatisfied with the platform.

Access to Similar Support, Satisfaction and Value of the OBI Network

Company and community organization respondents were asked how difficult it would have been to access similar services or assistance - comparable in content, cost, and quality - from sources outside of OBI.⁶ We found that 89% of respondents across companies and community organizations indicated it would have been difficult to access similar support from another provider. This finding suggests that the services offered by OBI are unique and are meeting the diverse needs of these stakeholders.

“We are extremely grateful for the funding and profile we have received from OBI for our research. We are optimistic that this will influence public policy in the future.”

- Community Organization Respondent

We also found that 80% of respondents across the three stakeholder groups report that they are very satisfied or satisfied with their relationship with OBI. Further, 94% of respondents across the three stakeholder groups indicated they found their engagement with OBI’s network to have been very valuable, or valuable. This speaks to the quality of OBI’s connections within the neuroscience sphere, and their ability to facilitate connections between their various stakeholders.

Impact Attributed by Stakeholders

Impact on Resources and Capabilities

In general, stakeholders attribute OBI with high levels of impact on improvements to their resources and capabilities.

⁶ Researchers were not asked the survey question regarding access to similar support.

Companies

As shown in Figure 1.1, companies attributed positive impact on improvements to their resources and capabilities to OBI. Ten (10) measures were used to assess these impacts, including the impact of OBI on companies’ technical capabilities, technology development, knowledge, intellectual property (IP), etc.

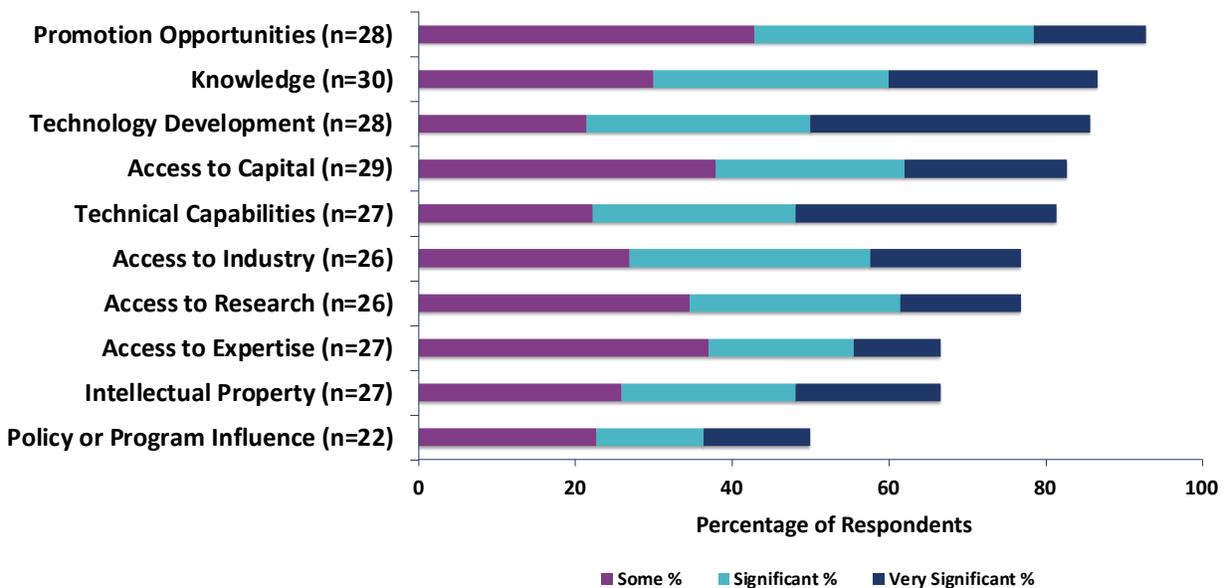


Figure 1.1 Percentage of Companies Attributing Positive Impact on their Resources and Capabilities⁷

We see in Figure 1.1 that the greatest percentage of companies attributed OBI with positive impact on their ability to promote their company and their ability to improve their knowledge base. This suggests that engagement with OBI has allowed companies to increase their exposure within the neuroscience ecosystem and to improve their knowledge of various neuroscience components. This exposure is critical for many companies because they are small and relatively unknown within the neuroscience community. As such, they benefit greatly from the support provided by OBI, which helps to bring attention to their work.

⁷ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

“We are totally satisfied with OBI's ongoing support in our journey to commercialize our medical device.”

- OBI Company Respondent

Community Organizations

As shown in Figure 1.2, community organizations attributed positive impact on improvements to their resources and capabilities to OBI. Thirteen (13) measures were used to assess these impacts, including the impact of OBI on organizations’ knowledge, promotion opportunities, influence opportunities, etc.

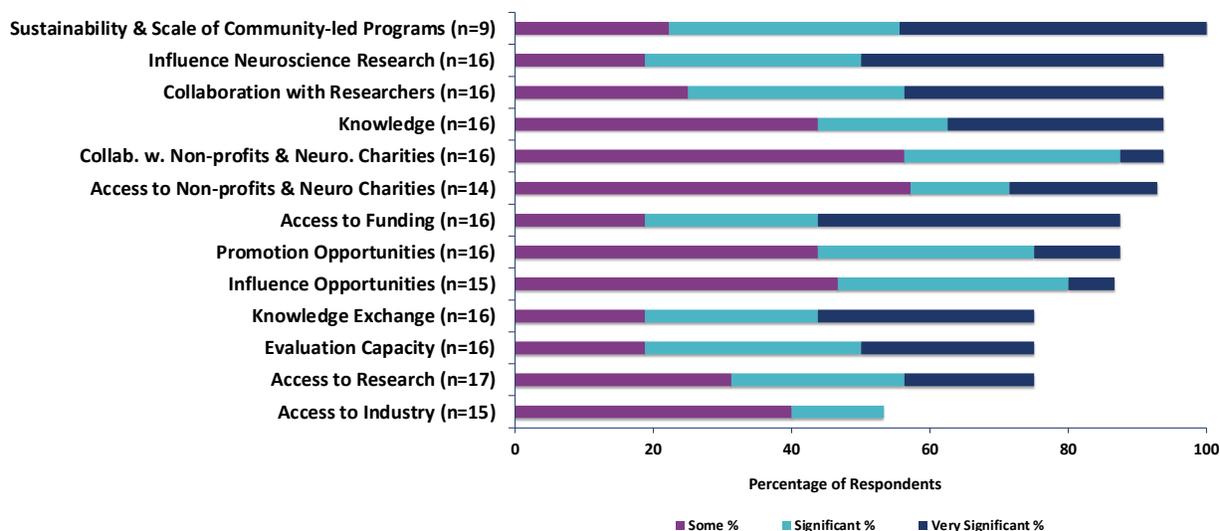


Figure 1.2 Percentage of Community Organizations Attributing Positive Impact on their Resources and Capabilities⁸

We see in Figure 1.2 that 100% of respondents attribute OBI with positive impact on their ability to increase the sustainability, scale and/or spread of community-led programs. This finding should be interpreted with caution, as the number of respondents to this question is low.⁹ Additionally, 94% of respondents indicated positive impact on four measures; their ability to influence neuroscience research, collaborate with researchers, improve their knowledge base, and collaborate with

⁸ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

⁹ There were 11 respondents to the question, of which two indicated the question was not applicable.

other non-profits or neurological charities. This suggests engagement with OBI has improved respondents' ability to influence neuroscience-related research and activities, and improve their knowledge, and that OBI has facilitated the direct engagement amongst community organizations, and between community organizations and researchers. These relationships are critical in order to bring the latest neuroscience technologies from development, into application. Improvements to community organizations' knowledge base indicates improvements to knowledge of devices, products, treatments, interventions, patient care information, educational programs, or other pertinent technical, research, or healthcare system information. Further, there is growing recognition of the importance of patient-informed research, and OBI is active in this area by ensuring the patient voice is embedded into research, evidenced by how OBI has been able to impact community organizations' ability to influence neuroscience research and facilitate collaborations between community organizations and researchers.

“OBI has been a great support to our organization. They have supported us not only with resources but also with valuable advice and connections on creating a strategy for spread, scale, and sustainability. We feel very fortunate to have engaged with OBI and its network. OBI has helped Ontario-grown innovations like ours - practical, evidence-based innovative programs for complex brain disorders - to gain traction and spread throughout the province.”

- Community Organization Respondent

Researchers

Strategic Direction

As shown in Figure 1.3, researchers attributed positive impact to OBI and the IDPs they facilitate on improvements to their Strategic Direction resources and capabilities. Twelve (12) measures were used to assess these impacts, including the impact of OBI on researchers' ability to engage in new research methodologies, engage in new clinical practices, identify or implement relevant research, etc.

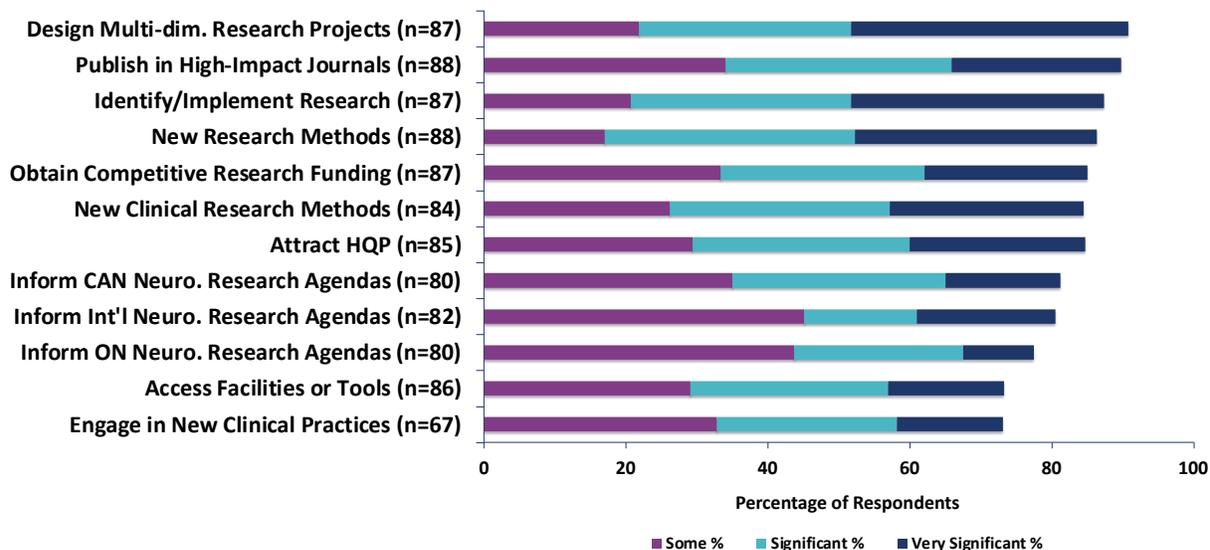


Figure 1.3 Percentage of Researchers Attributing Positive Impact on their Strategic Direction Resources and Capabilities¹⁰

We see in Figure 1.3 that the highest percentage of researchers attributed OBI with impact on their ability to design multi-dimensional research projects and publish in high-impact international journals. This suggests engagement with OBI and with OBI’s IDP model of research collaboration is allowing researchers to generate more impactful results through enhanced project design and publication quality. Specifically, researchers’ ability to enhance the design of research projects so as to optimize research or clinical productivity, or meet practical milestones for external end-use has been improved, as has the ability of researchers to gain access to high impact international journals, publish with others in these journals, and attract collaborators or co-authors to enhance the quality of research, analysis, and interpretation, to a greater degree than would have been possible without support from OBI.

Projects and Performance of Research

As shown in Figure 1.4, researchers attributed positive impact to OBI and the IDPs they facilitate on improvements to their Projects and Performance of Research resources and capabilities. Five (5) measures were used to assess these impacts, including the impact of OBI on their ability to disseminate research results, promote research results, etc.

¹⁰ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

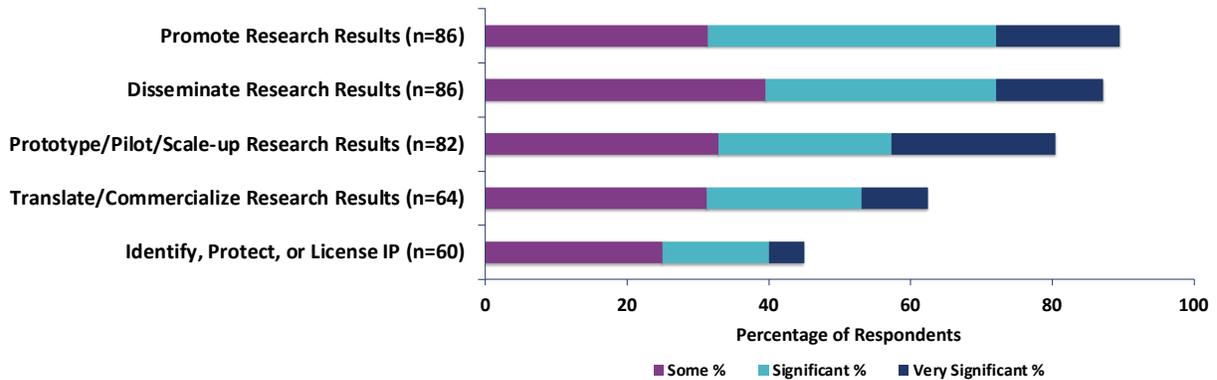


Figure 1.4 Percentage of Researchers Attributing Positive Impact on their Projects and Performance of Research Resources and Capabilities¹¹

We see in Figure 1.4 that the greatest percentage of researchers attributed OBI with impact on their ability to promote research results and disseminate research results. This suggests engagement with OBI has enabled researchers to improve the visibility of their research, and to reach more individuals and entities with their research than they would have been able to, without support from OBI.

Alliances and Networks

As shown in Figure 1.5, researchers attributed positive impact to OBI and the IDPs they facilitate on improvements to their Alliances and Networks resources and capabilities. Eight (8) measures were used to assess these impacts, including the impact of OBI on their ability to participate in, or lead (provincial, national, and international) research networks or projects, access other not-for-profit or neurological charities, etc.

We see in Figure 1.5 that the greatest percentage of researchers attributed OBI with impact on their ability to conduct research with other researchers. This suggests engagement with OBI has enabled researchers to expand their research networks to a greater degree than they would have been able to, without support from OBI.

¹¹ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

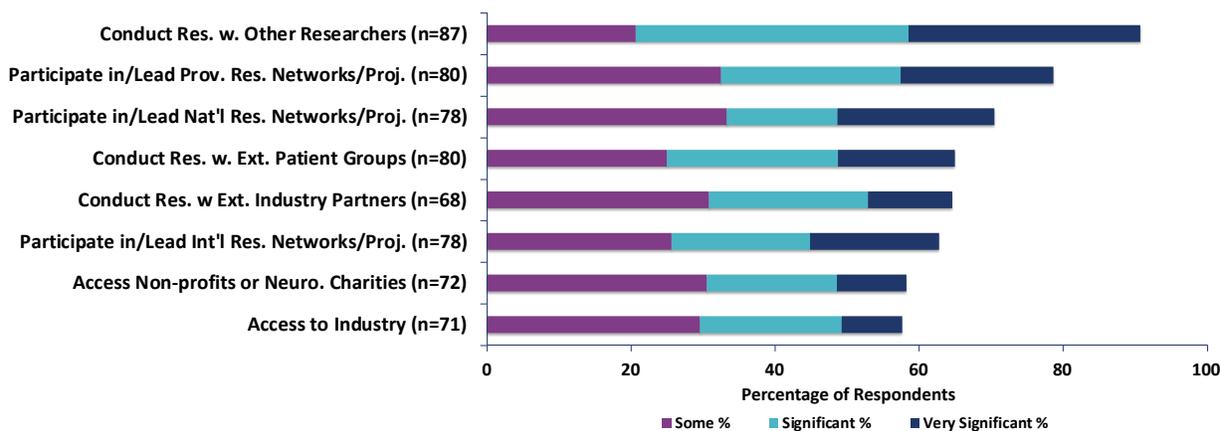


Figure 1.5 Percentage of Researchers Attributing Positive Impact on their Alliances and Networks Resources and Capabilities¹²

“OBI facilitates scientific collaboration on a scale no other entity has done before in our field. OBI helps us move research to policy and practice in a systematic way. OBI facilitates meaningful inclusion of patients and families in our research. OBI connects IDPs for research that cuts across diagnoses.”

- Researcher Respondent

Impact on Performance

Following our logic model approach for assessment of impact, OBI achieves long-term impacts in the form of socio-economic benefits by helping companies, community organizations, and researchers to improve their performance. Performance improvements occur as a consequence of the impact that OBI has on improving resources and capabilities. Measuring impact on performance is important because it corresponds to the mission of OBI and provides the hard evidence that stakeholders seek.

¹² Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

However, performance depends on a number of factors and so to assess impact on performance we consider both the performance and the degree to which this performance is attributable to OBI.

Companies

As shown in Figure 1.6, nine (9) measures were used to assess the impact of OBI on company performance, including investments received, change in market valuation, new customer acquisition, etc.

The highest percentage of respondents (93%) attributed positive impact on both their change in market valuation and investments received, and 90% of respondents attributed positive impact on their degree of innovation. These findings suggest that OBI is positively affecting the ability of companies to innovate, secure funds, and expand and develop their business, thus increasing their competitiveness and likelihood for continued success.

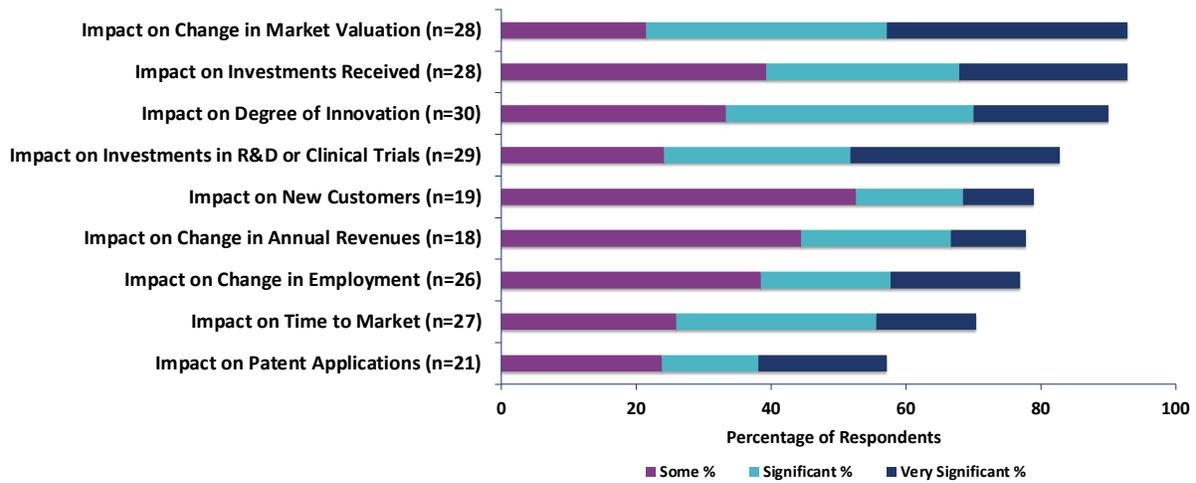


Figure 1.6 Percentage of Company Respondents Attributing Positive Impact on their Performance¹³

¹³ Respondents indicating 'not applicable' (n/a) have been removed from the calculations.

Community Organizations

As shown in Figure 1.7, four (4) measures were used to assess the impact of OBI on the performance of community organizations. Overall, we can see that OBI is positively impacting the performance of these organizations to a moderate-to-high degree, and that 93% of respondents attributed positive impact on their funding received measure. This suggests OBI is positively affecting the ability of community organizations to attract funding to a great extent, which, as non-profits, is crucial to their operability.

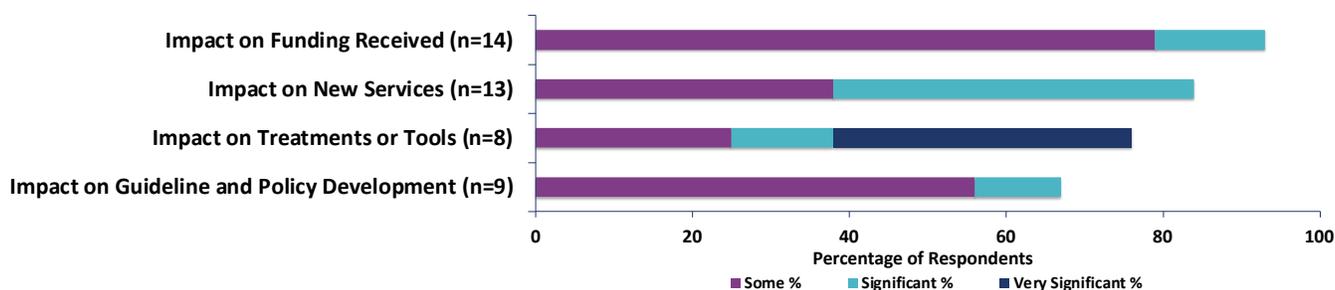


Figure 1.7 Percentage of Community Organizations Attributing Positive Impact on their Performance¹⁴

Researchers

As shown in Figure 1.8, nine (9) measures were used to assess the impact of OBI on researcher performance. The percentage of researchers that reported positive impact on many of these measures is high, which speaks to the ability of OBI to positively affect researchers into the longer-term.

Of particular note is the high percentage of respondents that attributed positive impact on their ability to submit papers for publication to refereed journals or to conferences for peer review (94%), which is important, as the publication of research findings is essential to the advancement and dissemination of neurological research, and over time, those who have published results are likely to advance their research further. Therefore, impact on refereed publications may be considered a leading indicator of the *future* impact that OBI will have on the performance of researchers. It is important to note that improvements to performance take time, especially within the healthcare system and for researchers in particular, whose work often takes years to be fully realized.

¹⁴ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

The second-highest percentage (89%) of respondents attributed positive impact on the value of funding received by themselves or their research team. This indicates a beneficial relationship with OBI in terms of securing funds for their various projects.

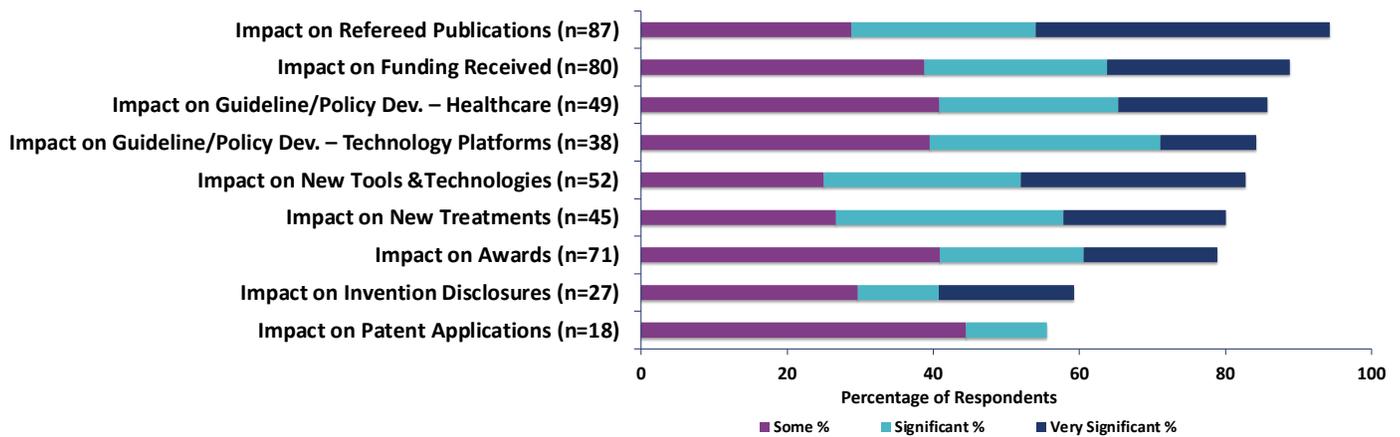


Figure 1.8 Percentage of Researchers Attributing Positive Impact on their Performance¹⁵

“The engagement with OBI has been highly valuable. Because our IDP received a relatively small amount of funds from OBI in the last 2 years, we are only just starting to see the products from this support. The CONNECT network would not have formed without OBI and we are grateful for the support however, it is very early days relative to the other IDPs that OBI funds.”

- OBI Researcher Respondent

Impacts on patent applications and invention disclosures are the measures with the fewest respondents attributing positive impact. However, it is important to note that very few respondents indicated they applied for patents (10 out of 90 respondents) or disclosed inventions (20 out of 88 respondents). Further, of those respondents who did apply for patents, 80% (8 out of 10) attributed positive impact on their ability to do so. Additionally, of those respondents who did disclose

¹⁵ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

inventions, 80% (16 out of 20) attributed positive impact to OBI on their ability to do so. This is important, as patents and invention disclosures may not be applicable to many researchers at this point in time, however it is evident that OBI plays an important role for the researchers that are applying for patents and disclosing inventions.

Aggregated Impact

In addition to the impact of OBI on the resources, capabilities, and performance of stakeholders, OBI is also attributed with aggregated, quantifiable impacts on companies. We found that, since March 2017, the 15 respondents who indicated their companies have generated revenues attributed \$548K in increased annual revenues to OBI¹⁶, which accounts for approximately 6% of the total change in annual revenues reported by these companies since March 2017.

Additionally, since March 2017, company respondents attribute \$13.8 million in investments received to the support of OBI, which accounts for approximately 18% of the total investments received by these companies since March 2017. Finally, since March 2017, company respondents attribute the creation of 10.5 full-time equivalent (FTE) jobs to the support of OBI, which accounts for approximately 8% of the total change in employment for these companies since March 2017.

These impacts provide clear measures of OBI's impact on companies and, subsequently, the economy at large.

OBI's Capacity-Building Efforts

To assess the degree to which OBI is achieving its overarching goal to support the development of a vibrant brain health ecosystem and neurotechnology cluster in Ontario, and to a lesser extent Canada, we asked company and community organization respondents about their perspectives on OBI's capacity-building efforts. Three measures were used to assess the impact of OBI's capacity-building efforts: *Promotion of Ontario, Policies and priorities*, and *Innovation and commercialization*.

¹⁶ Note that the value of attributed annual revenues is due to the following factors: 1) there were 30 company respondents to the impact assessment survey in total, however, 14 of these companies indicated they are pre-revenue; 2) one of the companies did not respond to the survey question regarding revenues, and 3) of the 15 respondents who indicated their company does generate annual revenues, nine (9/15 = 60%) indicated their company generates annual revenues of less than \$500K.

Companies

Figure 1.9 shows the percentage of company respondents indicating they have observed positive impact, or that they anticipate positive impact in the future, on the three measures used to assess the impact of OBI’s capacity-building efforts on the neurotechnology cluster in Ontario and Canada. We can see in Figure 1.9 that 100% of company respondents have observed positive impact on the *Promotion of Ontario* and *Innovation and commercialization* measures.

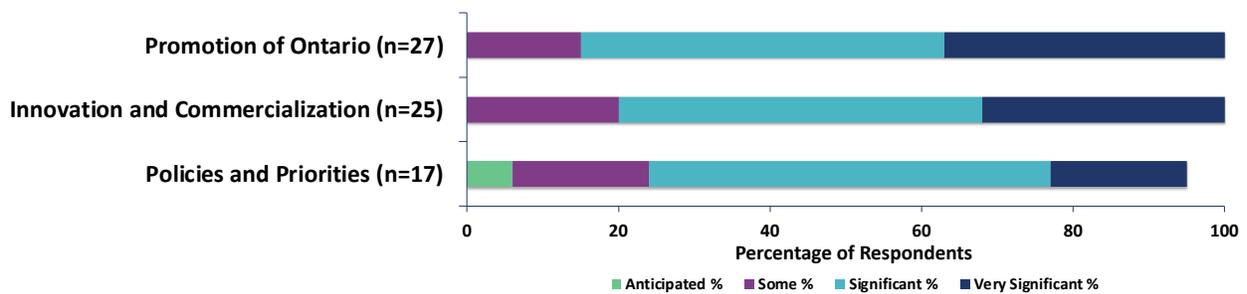


Figure 1.9 Percentage of Company Respondents Having Observed Positive Impact of OBI’s Capacity-Building Efforts on the Neurotechnology Cluster¹⁷

Community Organizations

Figure 1.10 shows the percentage of community organization respondents indicating they have observed positive impact, or that they anticipate positive impact in the future, on the three measures used to assess the impact of OBI’s capacity-building efforts on the brain health ecosystem in Ontario and Canada. We can see in Figure 1.10 that 100% of respondents from community organizations have observed positive, and anticipated positive, impact on all three measures, and that a greater percentage of respondents indicated they observed ‘very significant’ impact on the *Promotion of Ontario* and the *Innovation and commercialization* measures.

¹⁷ Respondents indicating ‘not applicable’ (n/a) have been removed from the calculations.

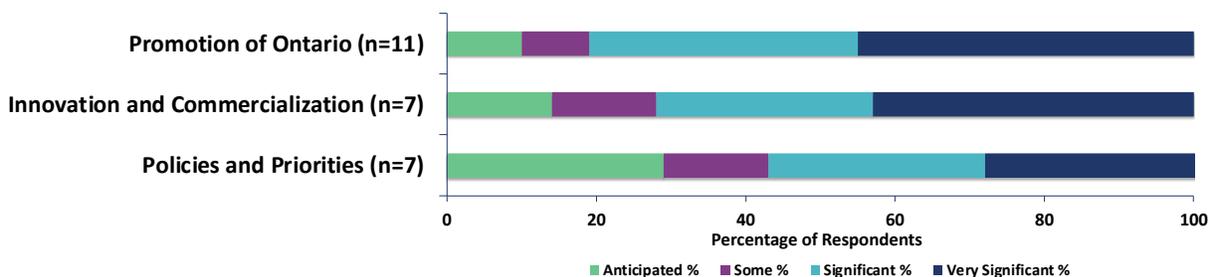


Figure 1.10 Percentage of Community Organization Respondents Having Observed Positive Impact of OBI's Capacity-Building Efforts on the Brain Health Ecosystem¹⁸

How Impact is Achieved

To better understand how OBI has achieved impact on the performance of stakeholders, we conducted correlation¹⁹, and regression analyses to examine the relationships between the impact of OBI on stakeholder performance and factors associated with that impact. We see throughout the associated findings that the short-term impact of OBI, which stems from the day-to-day work of the staff, the services provided to the stakeholders, and the subsequent improvements to stakeholders' capabilities, is related to longer-term impacts on performance. The findings that follow suggest that the work of OBI is having a positive impact on the neuroscience ecosystem and that the OBI model is working.

Companies

Those companies OBI has impacted in terms of improving their technical capabilities, technology development, knowledge and IP, are more likely to attribute OBI with greater impact on increases in their market valuation, the value of investments they secure, their innovativeness, the number of products they develop, and the introduction of their products into the marketplace more quickly.

Those companies OBI has impacted in terms of improving their ability to promote themselves, gain access to other companies and/or HQP, and secure capital are more likely to attribute OBI with greater impact on the number of employees they hire and/or retain, and the number of patents they have applied for.

¹⁸ Respondents indicating 'not applicable' (n/a) have been removed from the calculations.

¹⁹ Due to data paucity, we cannot conduct reliable regression analysis based on a sample of less than 30 respondents. Instead, we use correlation analysis to explore which variables are related to impact on company performance. Correlation analysis is used to identify the association between two variables, but not to predict the relationship among variables.

Moreover, higher engagement by companies in the Business Development and Partnerships initiatives is more likely to result in them attributing OBI with greater impact on the number of employees they hire and/or retain.

Additionally, older, growing companies that have acquired new customers are more likely to attribute greater impact to OBI on increases to their revenues.

Community Organizations

Those community organizations OBI has impacted in terms of improving their influence over neuroscience-related research and activities, their networking opportunities, their access to funding, their overall knowledge base and knowledge expansion opportunities are more likely to attribute OBI with greater impact on the number of new/improved services these organizations introduce to their members, and the number of healthcare guidelines/policies/regulations they have influenced.

Those community organizations OBI has impacted in terms of improving their overall visibility, their level of influence within the healthcare sphere, and their access to learning and networking opportunities are more likely to attribute OBI with greater impact on their knowledge of, and ability to introduce members to, treatments, tools, or devices for specific brain disorders.

Moreover, higher engagement by community organizations in both the outreach initiatives and the industry relations initiatives is more likely to result in them attributing greater impact to OBI on the number of brain disorder treatments/tools/devices they introduce to their members. Also, higher engagement by community organizations in the outreach initiatives is more likely to result in them attributing greater impact to OBI on the number of new healthcare guidelines, policies, or regulation they influence.

Researchers

Those researchers OBI has impacted in terms of improving their research practices, research collaborations, the visibility and scalability of their research, their ability to attract and train HQP, and their ability to obtain funding are more likely to attribute OBI with greater impact on the number of papers they submit to journals or conferences, the number of awards they receive, the value of funding they receive, and the number of new or improved tools and technologies they develop.

Those researchers OBI has impacted in terms of improving their research networks, nationally or internationally, are more likely to attribute OBI with greater impact on the number of papers they submit to journals/conferences, the number of awards they receive, and the value of funding they receive.

Those researchers OBI has impacted in terms of improving their ability to engage in new clinical practices, participate in or lead provincial networks or projects, and create and manage external connections are more likely to attribute OBI with greater impact on the number of papers they submit to journals/conferences, the number of awards they receive, the value of funding they receive, and the number of healthcare guidelines/policies/regulations they develop.

Those researchers OBI has impacted in terms of improving their ability to translate or commercialize research results, manage IP, and gain greater access to industry are more likely to attribute OBI with greater impact on the number of papers they submit to journals/conferences, the number of inventions they disclose, the value of funding they receive, and the number of new/improved diagnoses/treatments they develop.

Moreover, higher engagement by researchers in the industry relations initiatives is more likely to result in them attributing greater impact to OBI on the number of patents they apply for and the number of new/improved tools or technologies they develop.

Thematic Analysis

In addition to the web-based survey, we also conducted interviews with a cross-section of survey respondents. We conducted telephone interviews 20 to 30 minutes in length with a cross-section of 26 survey respondents to discuss their interactions with OBI in greater detail.

Feedback from the interviews was reflected in a number of recurring themes, which are presented below for each stakeholder group.

Companies

Themes derived from interviews with companies include the role OBI plays in: facilitating connections for companies with a wide range of stakeholders; providing key funding to help companies reach important milestones and leverage additional funding; and lending credibility to companies through their association with OBI which helps them become more established within the ecosystem. Company interviewees also had incredibly positive feedback regarding the quality of OBI and its staff.

Opportunities for OBI to improve identified by interviewees include: reaching out more frequently to client companies to maintain a sense of inclusion; focusing on

providing more opportunities for networking with stakeholders within the neuroscience ecosystem; providing more support (financial and otherwise) for later-stage companies that are ready to scale; enabling more funding opportunities outside of OBI itself; and increasing companies' awareness of Brain-CODE and the value it may offer to them.

Community Organizations

Themes derived from interviews with community organization representatives include the prominent role OBI plays within the ecosystem in terms of: facilitating collaborations between community organizations and key stakeholders, particularly clinicians; the quality of OBI staff and the quality of their overall engagement with OBI; and the increased credibility these organizations realize due to their engagement with OBI.

Opportunities for improvement for OBI suggested by interviewees include: more of a focus on the "ground-level" to gain more of a patient-centric, true understanding of the needs of those living with brain disorders; identification and facilitation of additional connections outside of the GEEK program, and more learning opportunities to improve organizational capacity; strengthening OBI's presence and outreach to enhance their exposure within the neuroscience ecosystem; simplification of OBI's arsenal of programs and supports to allow for clarification of OBI's mission and improve accessibility to OBI's offerings; and increased support for proven research concepts to allow them to flourish, rather than focusing on early-stage innovations.

Researchers

Themes derived from interviews with researchers include the role OBI plays in: facilitating advancements in, and uptake of, neuroscience research; the facilitation of collaborations between researchers and other researchers, (international) research groups, patients, and industry; and attracting and retaining HQP such as students, post-docs, leading researchers, scientists and technologists. Further, respondents had overwhelmingly positive feedback regarding the value of Brain-CODE, in terms of its uniqueness, data quality and data accessibility. Respondents are also impressed with the high quality of OBI and its highly skilled staff.

Opportunities for improvement identified by interviewees include: undertaking more of a focus on training HQP to secure the future of neuroscience; implementing more fundamental and patient-centric research rather than having such a heavy emphasis on clinical-based research; finding synergy between big data and the goals of individual researchers; reducing the magnitude and frequency of reporting requirements to alleviate the burden these requirements place on researchers; and implementing various improvements to Brain-CODE (e.g.,

enhancing user-friendliness, expanding data input sources, etc.).

Opportunities for OBI

Enabling More Collaborations

Combining the results of the qualitative interviews for community organizations and companies, an overarching opportunity for OBI emerges in terms of enabling more collaborations within the neuroscience ecosystem. Identifying and facilitating additional connections for stakeholders will allow for the expansion of the neuroscience network as a whole, while enabling additional learning opportunities, and funding opportunities. Having access to information regarding other entities in the neuroscience ecosystem stakeholders may benefit from connecting with would be helpful, including information on how best to form and foster these connections. Respondents indicated a need for OBI to focus on expanding the neuroscience network, for example, through a recurring virtual “speed-dating” event during which stakeholders would connect for brief, timed chats through zoom, or a similar platform, to know enough about each other to determine whether it would be worthwhile for them to exchange contact information and pursue a working relationship. Respondents also indicated that assistance accessing additional funding opportunities outside of OBI would be helpful, and that more funding opportunities focused on later-stage businesses would be beneficial. Early-stage funding is available to get companies started is readily available but more links to later stage funding are needed. If OBI could make more funding channels available, this would be key to industry stakeholders in the neuroscience sphere.

Increase Awareness of Brain-CODE

An opportunity exists for OBI to increase company awareness of Brain-CODE. Both the quantitative and qualitative analyses reveal that a gap exists with regards to understanding exactly what the Brain-CODE platform is and what it can be used for. Though not all companies that engage with OBI require Brain-CODE to advance their business portfolio, understanding exactly what this platform has to offer would be beneficial. Though it is a repository for researchers to upload their data, access to the database has proven valuable for those companies that have made use of it.

Conclusion

Our findings from the impact assessment demonstrate that OBI is soundly on the path to establish Ontario as a world leader in brain discovery, commercialization, and care.

It is evident that the programs and activities provided by OBI are meeting the needs of stakeholders. As a result, OBI should continue to enhance the quality of, and access to, its existing programs and activities to strengthen impact on stakeholders, with the ultimate goal of fostering discovery and delivery of innovative products and services that will improve the lives of those living with brain disorders.

Overall, stakeholders attribute OBI with substantive impact on their resources and capabilities and on their performance. It is evident throughout the analysis that improvements to stakeholders' resources and capabilities and performance are helping to mould and advance neuroscience in Ontario. Further, respondents have observed high levels of impact of OBI's capacity-building efforts on the neuroscience ecosystem.

The Evidence Network Inc. trusts that the information provided in this report will facilitate discussions between OBI and its stakeholders to ensure a constantly improving set of programs and activities, and that those programs and activities continue to positively impact stakeholders.