CENGN

ANNUAL REPORT

FY 2022 | APRIL 1 2022 - MARCH 31 2023

VISION

Advancing global technology innovation for the prosperity of all Canadians.

MISSION

CENGN, Canada's Centre of Excellence in Next Generation Networks, drives technology innovation and industry growth through our testbed, technical expertise, talent development, and partner ecosystem.

ACCOMPLISHMENTS

236
SME Projects

$111M
Private Sector Follow-On Investments

314
Internships

2413
People Trained

11k+
Jobs Created*

$1.15B
Contributed to GDP*

Note: All numbers are since CENGN's inception.

*per Nordicity Group Limited and Networks, Economics & Strategy (NE&S)

TABLE OF
CONTENTS

A LETTER FROM THE CHAIR

TOM ASTLE
Chair of the Board of Directors

CENGN continues to lead the way in driving innovation and adoption of advanced networking technologies in Canada to support the competitiveness of Canada's innovation economy and of its strategic vertical industry sectors. Fiscal year 2023 marked a major cornerstone for CENGN with the completion of both the Ontario Next Generation Network Program (NGNP) and the federal CECR program. The organization has taken this moment to reflect on the powerful impact CENGN has made on the Canadian tech ecosystem, as well as plan for the next phase of CENGN and its programming. Throughout this report, you will see our major accomplishments and gain insight into CENGN's strategic direction to enable continued economic, innovation, and technology benefits from digital transformation in Canada.

As always, CENGN is committed to its mission to drive technology innovation and industry growth through our infrastructure, technical expertise, talent development efforts, and ecosystem of partners. Through CECR and NGNP, this mission culminated in overachievements across all key performance indicators and major impacts on Canada's innovation economy. Startups and scaleups that completed an innovation project with CENGN brought over 1,150 new products to market, generated $40 million in incremental sales, won over 4,600 new customers, and secured $111 million in follow-on investment.

These world class numbers have had a major impact on the Canadian economy. Through our efforts, CENGN's programs have delivered over 11,000 jobs and a GDP contribution of $1.15 billion. Government funders benefited from $308 million in incremental tax revenue. With this track record, CENGN looks towards the future confident in its role to advance Canada's global competitiveness in digital technology and support the commercial growth of our country's innovation rich SME ecosystem.

On behalf of the CENGN team, I thank all of those who have supported CENGN through its first two major programs. Firstly, our government partners whose guidance and support throughout both CECR and NGNP have enabled us to overachieve on all requirements. Secondly, our ecosystem of members and partners, whose collaborations have ensured that the impacts of CENGN's programs were amplified throughout the Canadian tech community and continue to drive innovation growth across the country. Finally, a deep thank you to all the CENGN staff who worked tirelessly to achieve our goals and continue to act as the foundation for the excellence that our organization has built a reputation for.

CENGN's next chapter is already underway as we work with our ecosystem and funders to develop new programming that aligns with Canada's new tech and innovation landscape. We invite you to reach out to the CENGN team to learn more and see how your organization can get involved in being part of driving innovation for all Canadians.

A LETTER FROM THE PRESIDENT & CEO

JEAN-CHARLES FAHMY
President & CEO

Widespread availability of advanced networks, 5G, cloud and edge computing, and AI, have brought the Canadian economy to a turning point. Early adopters across industry have already proven the massive benefit of digital transformation, integrating network technology and digital applications to substantially improve business performance, increase productivity, optimize resource utilization, and mitigate risks. Across the globe, organizations that embrace the responsible implementation of digital technology are seeing major gains in their competitiveness. It has become clear that the next race for economic and social well-being will be won and lost through a nation's ability to digitalize its key industries, infrastructure, and public services.

Canada is positioned to take full advantage of the next generation of digital technology. We have both a resource rich country paired with a highly ranked innovation ecosystem and a strong foundation of highly qualified personnel. This combination gives our country the tools to overcome some of the most difficult challenges facing the world economy, namely overdependence on weakening supply chains and a talent pool that cannot match growing demands.

Though we may have the right ingredients to greatly improve our standings, there are some major obstacles to overcome before we can progress. According to the World Intellectual Property Organization, Canada currently ranks 40th in use and 69th in access to information technology. This is a major contributor to our current ranking of 76th in labour productivity. These results indicate the clear need for Canada to focus on enabling digital transformation. It also illustrates the massive growth potential technology can have in our country.

CENGN is currently working with our ecosystem of industry, government, regional innovation centres, and academic partners to build new initiatives that align with Canada's current needs. With Industry 4.0 in full swing, it is critical to not only continue to drive the commercialization of Canadian digital innovations but also to support the adoption of these solutions across our key economic sectors. Currently, much digital transformation is blocked by common concerns like having a safe sandbox for innovation, understanding integration costs and ROI, talent requirements, and cybersecurity implications. Only by tackling both the innovator and adopter side of digital transformation will we be able to optimize the technology's impact on our economy and society.

CENGN will work to create more collaboration between the innovative SMEs building digital applications and the leading organizations of Canadian industry. Providing both access to advanced network infrastructure and tech talent to collaborate on market viable digital solutions can serve as a catalyst for digital transformation across the country.

The CENGN team is currently working with the Canadian tech ecosystem to develop a nationwide program designed to harness innovation and adoption of 5G and advanced network technologies to deliver the economic and public benefits of digital transformation, while also focusing on the responsible implementation of digital applications to safeguard Canadian values of diversity, equity, and inclusion, security and privacy, and environmental sustainability. More details will be coming soon, in the meantime, this annual report is a great resource to understand the current state of CENGN.

BOARD OF DIRECTORS

TOM ASTLE
Chair – Corporate Director & Partner, Longevity Funds

STEPHANIE RATZA
Vice Chair – CFO, Loopio

ROBERT BARTON
CTO & Distinguished Architect, Cisco

KIM BUTLER
Business Advisor, Business and Financial Advisory

TOM BURSEY
CFO & VP, Council of Canadian Academies

JULIA ELVIDGE
Co-founder, SheBoot

SACHA GERA
CEO, JSI Telecom

RAFIK GOUBRAN
VP & Chancellor's Professor, Carleton University

AL HURREN
EVP, Engineering and Operations, Mitel

SUNIL KHARE
Director, Technology Strategy & Operations, TELUS

NORM PETERS
SVP, Engineering, Ribbon Communications

MICHELLE SIMMS
President & CEO, Genesis

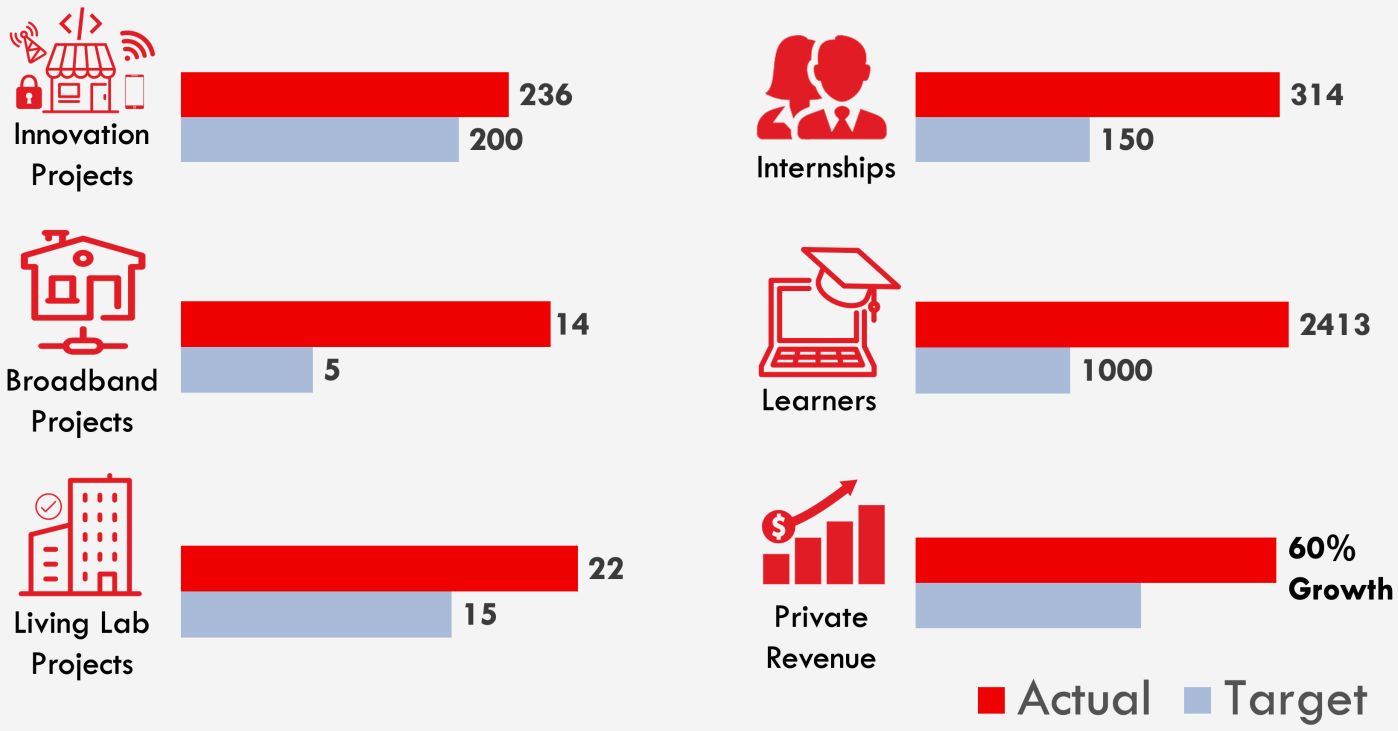
SHAWN SPARLING
VP, Enterprise and Public Sector, Nokia

JILL TIPPING
CEO, BC Tech

CENGN MAKING

IMPACTS & OVERACHIEVING

Fiscal year 2023 marked the completion of both our provincial NGNP and federal CECR program. CENGN has overachieved across the board on each program's key performance indicators. These numbers represent the learned experience and skills gained for future programs to come, as CENGN looks to support Canadian economic and innovation growth through enabling digital transformation. Overall, CENGN programs achieved a 10:1 return on investment.



SME Growth

$40M
Incremental Sales

$111M
Follow-on Investments

Innovation Adoption

1,100+
Product Introductions

4,600+
Customers Gained

Talent Development

97%
Intern Employment Rate

83%
Applying Learned Skills

Canadian Impact

11,910
Jobs Created

$1.15B
GDP Contribution

THE CANADIAN INNOVATION OPPORTUNITY

Telecom capabilities have continued to increase dramatically since CENGN's inception in 2014. The deployment of 5G networks across Canada and the globe have created a connected world for both people and industry. This connectivity has set the stage for Canada's new competitive landscape.

Over the next decade, there will be an estimated GDP growth of $1.3 trillion globally and $200 billion in Canada enabled by the deployment of new digital solutions and cyber secure 5G and advanced networks. Canada realizing this opportunity depends on its industry's ability to adopt critical technology solutions across key economic sectors and on its SME innovators' ability to develop and sell digital solutions across domestic and global markets.

The reason is clear, digital transformation stands to supercharge productivity across all sectors. Currently, organizations from across Canadian industry that have implemented digital technology have seen an average growth in productivity of 10-20%.

Through the experience and learnings of CENGN's first eight years, and with the support of a broad ecosystem of industry partners, we have developed an innovative program approach centered on Living Labs that will lower risk, accelerate learning cycles, and reduce barriers to successful adoption and commercialization of digital tech in Canada.

$200B
Digital Transformation Opportunity

IoT

$106B
Growth in Industrial IoT by 2026

DIGITAL TRANSFORMATION **ACROSS SECTOR**

Smart Mining

Mineral production estimated to rise 500% by 2050

Smart Agriculture

SmartAg technology is set to grow to $25.4B globally by 2028

Smart Factories

Manuf. is Canada's strongest economic output at $174B GDP

Smart Mobility

Market expected to exceed $250B USD globally by 2030

Smart Infrastructure

Market will be an estimated $434B USD globally by 2028

Customer Experience | Speed of Innovation | Operational Efficiency | Business Value From Data | Employee Engagement | Profitability

10-20% POTENTIAL GROWTH IN PRODUCTIVITY

PROJECT
HIGHLIGHTS

Hands-On and Realistic Cybersecurity Training with Cyber Range

EDUCATION

CYBERSECURITY

Field Effect's "Cyber Range" allows instructors to design testing environments quickly, enabling immersive experiences that prepare cybersecurity students to become experts in the real world. Field Effect leveraged a CENGN Project to identify and address scalability bottlenecks before production in customer sites.

Revolutionizing Fruit Production with Vivid X-Vision

FARMING

The "Vivid X-Vision" system captures plan-level data to see plants' chemical and physical properties, providing early-stage issue detection and automated counting and sizing of fruitlets through yield production. Vivid Machines used CENGN to train their machine learning models to detect fruit and tree attributes more accurately and validated their model's accuracy met market requirements.

ARTIFICIAL INTELLIGENCE

Management Decision-Making AI with Advanced Symbolics

MARKET RESEARCH

ARTIFICIAL INTELLIGENCE

Advanced Symbolics is the first company to offer a probabilistic sampling of social media through their solution "askpolly," providing brand managers with insight into new product trends, emerging market segments, and communication strategies. Advanced Symbolics demonstrated their solution could scale horizontally in a Kubernetes environment and optimized resource sizing to improve speeds.

Global Command and Control

DEFENCE

NORTAC Defence is a leading provider of hardware and software for Situational Awareness and Command and Control at the tactical level. The platform provides organizations with secure web-based applications or in-premise solutions behind client firewalls. NORTAC tested its beyond line-of-sight satellite device tracking system "TITAN", by leveraging CENGN's device simulation capabilities to measure bottlenecks as connected devices are scaled.

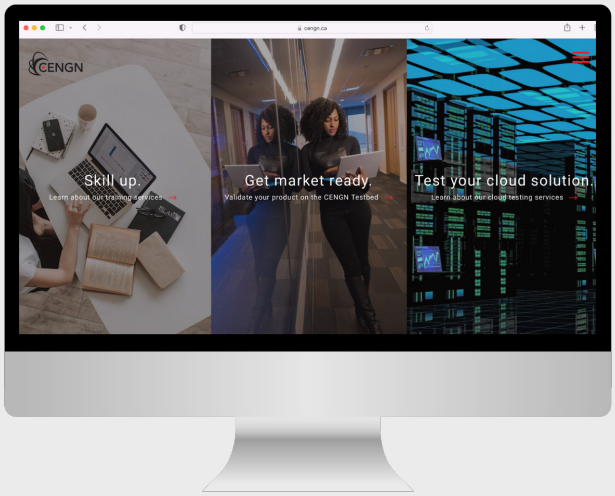
DATA CENTRE AND CLOUD

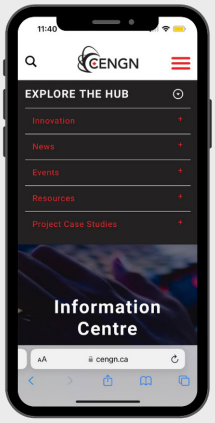
View more CENGN Innovation Projects here: https://www.cengn.ca/projects/project-case-studies/

DIGITAL & EVENT

BRAND GROWTH

MEASURING **WEBSITE PERFORMANCE**





156K
Unique Pageviews

185K
Website Visits

02:19
Avg. Time on Page

99
Health Score

CENGN's ecosystem of engaged innovators, professionals, and top talent continues to grow. CENGN has experienced a consistent increase in interactions with the Canadian tech community since its founding.

In FY23, CENGN took part in:

60 Innovation Events

15 Keynote Opportunities

20+ Training Workshops

Our Platforms Saw **Significant Growth in Engagement**

5.16K
LinkedIn Followers

2.88K
Twitter Followers

1.61K
Facebook Impressions

9.16K
Youtube Views

MEDIA
COVERAGE

During FY23, CENGN appeared in the media 503 times, an 97.3% growth from FY22. The articles reflect CENGN's growing presence provincially, nationally, and internationally.

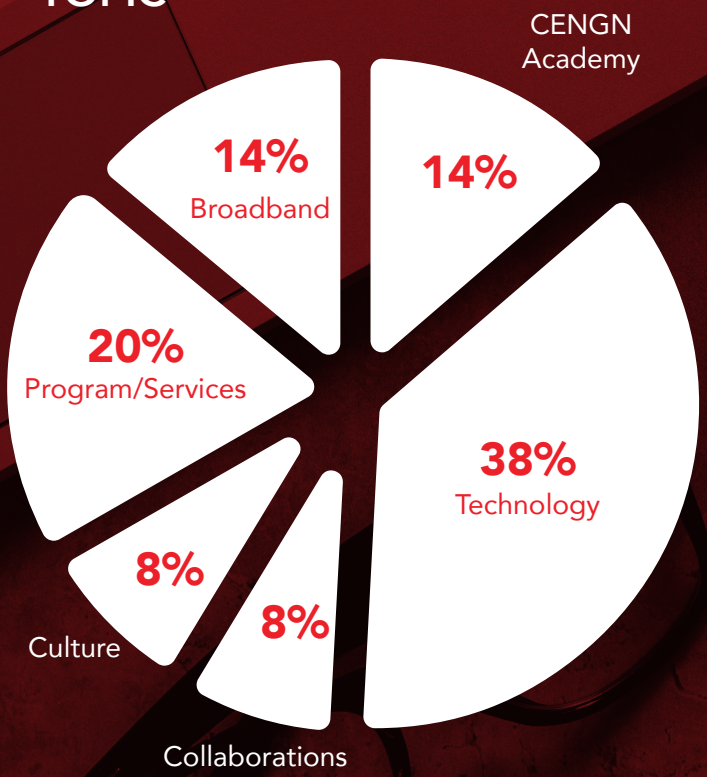
COVERAGE **BREAKDOWN**

Provincial: **24%**

National: **42%**

International: **34%**

TOPIC



"CENGN concluded, 'All economic sectors must be digital sectors. Enterprises in all sectors must develop processes for applying digital innovation enabled by [next generation network] technologies and services … for full benefits to accrue across society and for firms to remain competitive.

INNOVATION ECONOMY COUNCIL
October 2022

"There is no question that the technology adoption challenges in traditional sectors are daunting and will require both ongoing investment and ingenuity when it comes to developing viable use cases. But the status quo is not an option. In an era of climate change, food scarcity and energy transition, Canada must find a way to rebalance its two economic solitudes to build a prosperous future.

Interview with THE FUTURE ECONOMY
November 2022

"Spectrum is the currency of the wireless connection. To enable the potential of 5G we need to get the rest of the spectrum allocated, and we need to provide technology-innovation companies an environment where new 5G use cases can be tested and validated so that they can take full advantage of the potential.

Interview with CANADIAN BUSINESS
November 2022

STUDENT
PROGRAM

CENGN collaborated with colleges and universities across Canada to host student interns. Internships were offered in the fields of engineering, training, marketing, and human resources to provide students with valuable hands-on experience. Throughout their term, each student intern contributed greatly to CENGN's success, augmenting their academic learning to make a valuable impact on the industry while developing their professional skills. Continuing to the completion of CECR and NGNP, students from across Canada played a strong role in the many achievements of CENGN programs.

Visit cengn.ca/about/careers/student-opportunities/ to learn about becoming a student intern at CENGN

STUDENT **SPOTLIGHTS**

Omar Abotahoon
University of Ottawa
Cloud Infrastructure Engineering Student

Significant contribution to CENGN's automation framework

Alvis Lin
Carleton University
Video & Design Marketing Student

Produced video content on services and designed the FY2022 Annual Report

Taylor Park
Algonquin College
Animation and Graphics Student

Significant contribution to CENGN Academy courseware

Contact us at student-hr@cengn.ca to see how your organization can hire a CENGN student

314
Internships

97%
Employment Rate

ACADEMIC PARTNERS

Algonquin College
Ashbury College
Brock University
Carleton University
Concordia University
Dalhousie University
Georgian
Lambton College
McGill
McMaster University
Mitacs
OCI
Seneca
SAVI
Toronto Metropolitan University
Université Laval
University of Alberta
University of Calgary
University of Guelph
uOttawa
University of Toronto
University of Waterloo
University of Victoria
York U
Willis College

CENGN
NEWS

LIFT ALL BOATS: THE OPPORTUNITY IN DIGITIZING CANADA'S TRADITIONAL INDUSTRIES

In October, CENGN worked collaboratively with Canada's Innovation Economy Council to develop a report on the value of digital transformation for Canada's economy.

The report goes into depth on the digital gap between Canada's two increasingly disparate economies. One segment encompasses highly productive and tech-driven sectors, including advanced manufacturing, pharmaceuticals, biotech, food processing, aerospace, logistics, fintech, and engineering services. The players in these sectors have invested heavily in a broad range of digital technologies, from enterprise-management systems to robotics to AI and machine-learning tools.

The other segment encompasses Canada's most traditional industries - sectors that trace their roots to the country's origins, such as mining, forestry, agriculture, heavy industry, and energy. These sectors, which are now deeply enmeshed in global supply chains and are increasingly dominated by multinationals, have been far slower to embrace established and emerging Industry 4.0 tools, like IoT sensors, automation, and predictive analytics.

To remain competitive all Canadian sectors are faced with the challenge of embracing digital transformation.

Download the full report here:
https://innovationeconomycouncil.ca/reports/lift-all-boats-the-opportunity-in-digitizing-canadas-traditional-industries/

BLUEPRINTS FOR RURAL CONNECTIVITY

Access to enhanced connectivity is widely accepted as having the most significant impact on a community's success, both in terms of economic growth and public services. The fact is rural and remote communities are underserved because of the unique barriers that limit the business case for network deployments. Most remote communities have a low-density population with different geographical landscapes that can present specific problems for connectivity.

FY23 saw the completion of CENGN's Residential Broadband Program. The program enabled innovative projects across Northern and Rural Ontario to provide solutions that improve connectivity and close the digital divide between Canada's remote communities and urban centres.

CENGN partnered with internet service providers and thirteen communities with distinct geographic challenges to high-speed connectivity to develop innovative solutions for permanent, flexible, lower-cost, higher performance broadband access.

Not only did these projects provide Canadian residents with viable broadband services, the results have been captured by CENGN in the form of solution blueprints. Each blueprint goes over the broadband challenges facing the community and how the service provider implemented an innovative business case solution to providing affordable residential high-speed internet. These blueprints are now available as a resource for communities and service providers facing similar barriers to implementing broadband access.

CENGN

Access the catalogue of CENGN Residential Broadband Blueprints

https://www.cengn.ca/resources/white-papers/rural-high-speed-internet-blueprints/

CENGN

CANADA'S CENTRE OF EXCELLENCE FOR NEXT GENERATION NETWORKS

CENGN Headquarters
555 Legget Drive, Tower A, Suite 600
Ottawa, ON, Canada, K2K 2X3

Sources: cengn.ca/resources/annual-reports