



Economic Information Observatory
a regional cooperation project between
Atlantic Canada and **Saint-Pierre and Miquelon, France**

The Knowledge Industry



Atlantic Canada (p. 1-4)

Saint-Pierre and Miquelon, France (p. 5-8)



The Knowledge Industry in Atlantic Canada

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Forming an integral part of the **new economy** in which the dynamics of growth and development are powered by **new knowledge** and **high-level skills**, the **knowledge industry** in Atlantic Canada is a bouquet of dynamic sectors including pharmaceuticals, medicine, information and its various branches, training, e-commerce and online services, just to name a few. The accelerated development of new **knowledge** and **know-how** in these industries is leading to the addition to the regional economic landscape of companies active in the advancement of technological and business approaches constituting the new lifeblood of the economy.

Knowledge-based economy

Ranking of Canadian cities for knowledge-based competitiveness (Martin Prosperity Institute)

Canada's most creative cities

Cities with population of 100,000 or more with the highest proportion of jobs in science, advanced technology, the arts, design and architecture, culture, media, business and management, health and education



City	Rank	% jobs
St. John's, NL	9 th	37.1%
Halifax, NS	11 th	36.5%
Montréal, QC	13 th	36.3%

Ranking of cities for service orientation



Moncton, NB	11 th	52.4%
Halifax, NS	44 th	49.5%

Ranking of cities for presence of talent

Summary ranking combining types of jobs and highest level of education



Halifax, NS	10 th	78.6%
Montréal, QC	12 th	73.5%
Saint John, NB	41 st	51.7%

Ranking of cities for innovation

Combined measure of innovation based on number of patents filed per 10,000 habitants, venture-capital investment volume and number of jobs in the ICT sector



Halifax, NS	13 th	33.2%
St. John's, NL	37 th	18.4%
Moncton, NB	40 th	17.5%

Intangible assets and the new economy

Knowledge, R&D, corporate organization and publicity are building new capacity for companies while also adding to their intangible assets (patents, brands, new organizational structures, computer codes, etc.). The proportion of investment in intangible assets in Canada has more than doubled over the last 40 years.

Disruptive sectors and technologies

Knowledge work automation

Renewable energy

Next-generation genomics

3D printing

Mobile Internet

Internet of Things

Advanced robotics

Emerging materials

Oil and gas optimization, exploration and recovery

Energy storage

Cloud computing technology

Self-driving vehicles

In Canada, 6 out of 10 companies use advanced technology:

- ◇ **43.3%** use logistics technology
- ◇ **29.2%** use business intelligence technology
- ◇ **9.9%** use green technology
- ◇ **90%** of large enterprises use all 3 types of technology
- ◇ **76.4%** of medium-sized enterprises use advanced technology versus **56.4%** of small enterprises

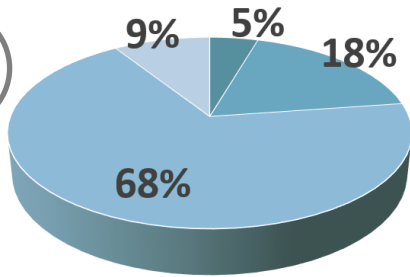
Selected sources and useful links:

Competition Bureau, www.competitionbureau.gc.ca/;
 Patented Medicine Prices Review Board (PMPRB), <http://pmprb-cepmb.gc.ca/>;
 Conference Board of Canada, www.conferenceboard.ca/;
 Ernst & Young, www.ey.com/;
 Innovation, Science and Economic Development Canada, www.ic.gc.ca/;
 Martin Prosperity Institute, <http://martinprosperity.org/>;
 McKinsey Global Institute, www.mckinsey.com/;
 Research Infosource, www.researchinfosource.com/;
 Rotman School of Business (U. Toronto), www.rotman.utoronto.ca/;
 Statistics Canada, <http://www.statcan.gc.ca/>.

Research and Development

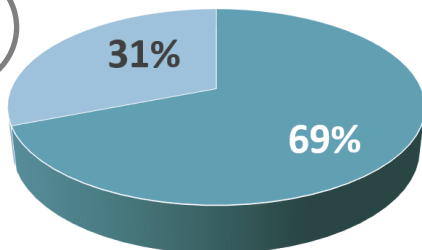
Intramural R&D expenditures at business enterprises by province
(in \$ millions)

PEI



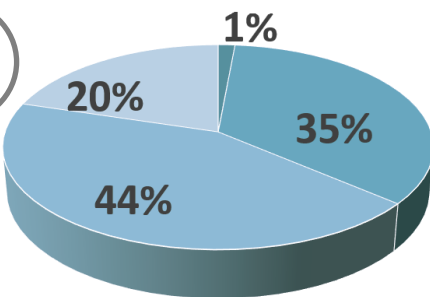
Agriculture	\$1M (5%)	Manuf.	\$4M (18%)
Services	\$15M (68%)	ICT	\$2M (9%)

NB



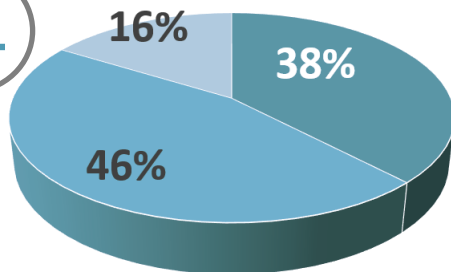
Services	\$29M (69%)	ICT	\$13M (31%)
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NS



Agriculture	\$1M (1%)	Manuf.	\$24M (35%)
Services	\$30M (44%)	ICT	\$14M (20%)

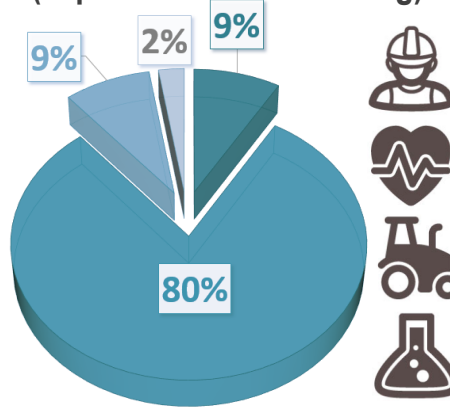
NL



Natural resource extraction	\$28M (38%)		
Services	\$34M (46%)	ICT	\$12M (16%)

(data from 2013, published in 2015 and 2016)

R&D at business enterprises in Canada (expenditures and staffing)



Engineering and technology = 80%

\$12,897 million 103,555 workers

Medical and health sciences = 9%

\$1,364 million 11,000 workers

Agronomy = 2%

\$402 million 3,297 workers

Natural sciences = 9%

\$1,368 million 14,480 workers

R&D carried out by business enterprises in Canada

2015 (in millions)

Total expenditures \$15,462

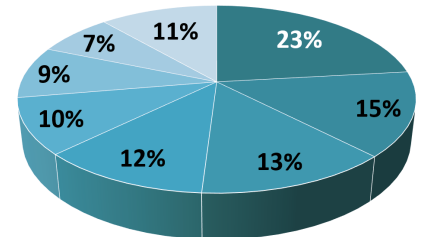
Current expenditures \$14,185

Wages and salaries \$9,620

Other expenses \$4,565

Property, plant & eqpmt. \$1,277

R&D in Canada by sector and expenditures in 2015



Aerospace (23.2%); ICT (14.5%); Pharma & bio (13.3%); Telecom hardware (11.7%); Energy/oil & gas (9.6%); Telecom software (9%); Other (11.4%)

Gross domestic expenditures on R&D by funding sector, by province

(in \$ millions)

	PEI	NB	NS	NL
Total	74	282	530	309
Federal government	27	84	183	66
Provincial government	2	7	13	9
Business enterprises	20	56	80	97
Higher education	24	123	226	127
Private non-profit	1	10	23	4
Foreign	n/a	2	5	6

Examples of Smart Companies Flourishing in Atlantic Canada



NS

DHX Media

<https://www.dhxmedia.com/>

- ▶ Founded in 2006 following the merger of Decode Entertainment and Halifax Film Company, DHX Media has become a Canadian leader and internationally recognized actor in the independent production, distribution and broadcast of television programs and content for children
- ▶ DHX Media owns the world's largest independent database of children's television content, with more than 11,800 half-hour episodes
- ▶ Active in more than 15 cities around the world, the company distributes its television content to



PEI

Timeless Medical Systems

<http://www.timelessmedical.com/>

- ▶ Develops and supplies advanced information technology systems for the medical industry

NB

Velante

<http://velante.com/>

- ▶ Specializes in services, technologies, infrastructures and implementation of electronic medical record (EMR) management systems

LuminUltra Technologies

<https://www.luminultra.com/>

- ▶ Develops microbiological water analysis tools with public health and industrial applications
- ▶ 85% of sales outside of Canada



NS

Daxsonics Ultrasound

<http://www.daxsonics.com/>

- ▶ Consulting firm and custom product provider in high-frequency ultrasonic imaging technology

NL

SequenceBio

<https://sequencebio.com/>

- ▶ Emerging biotechnology firm specializing in big-data exploitation with medical R&D applications (including a

NB

Apex Industries Automation & Product Development Group

<http://www.apexindustries.com/>

- ▶ Fabrication, construction, automation and development of metal products and other components for aerospace
- ▶ More than 225 employees, 88,000 projects and 6,000 customers

Greystone Energy Systems

<http://greystoneenergy.com/>

- ▶ Internationally recognized manufacturer of a wide range of sensors and transducers for heating, ventilation and air conditioning (HVAC) systems incorporated into advanced building automation management solutions

Cube Automation

<http://cubefoodprocessing.com/>

- ▶ Designs, produces and supplies integrated control systems for industrial equipment
- ▶ Develops process automation and programming systems
- ▶ Produces control panels and motor control centres



NB

Resson Agricultural Management

<http://www.resson.com/>

- ▶ Expert in precision farming through use of drones linked to integrated systems for big-data collection and predictive analysis with the objective of optimizing agricultural production

NB

ACFOR Energy

<http://www.acfor.ca/>

- ▶ Green energy solutions involving the use of wood chips from forest thinning operations in heating systems to reduce CO₂ emissions from fossil fuels and promote use of local renewable fuel

...Flourishing in Atlantic Canada (cont.)



Accreon Inc.

In addition to developing software solutions with applications in medicine, Accreon offers consulting and big-data analysis services.

A fast-growing company, Accreon announced in September 2016 the creation of 120 new jobs in New Brunswick, thereby injecting some \$16 million into the province's economy over the next 5 years.

ICT, WEB DESIGN, MULTIMEDIA

- ▶ Innovatia Inc.
<https://www.innovatia.net/>
- ▶ Accreon Inc.
<http://www.accreon.com/>
- ▶ PQA Testing
<http://www.pqatesting.com/>
- ▶ GoldNet Smart Technologies
<http://www.goldnet.ca/>
- ▶ Graphic Communications Group Inc.
<http://www.graphcom.pe.ca/>
- ▶ InternetWorks Ltd.
<http://www.internetworks.ca/>
- ▶ Revolution Media Inc.
<https://revolution.ca/>
- ▶ Atlantic Web Fitters
<http://www.atlanticwebfitters.ca/>
- ▶ BCI Eolutions
<http://bci-esolutions.com/>
- ▶ Remsoft Inc.
<http://www.remsoft.com/>
- ▶ Leading Edge Geomatics
<http://legeo.ca/news/>
- ▶ CARIS
<http://www.caris.com/>
- ▶ Earth Information Technologies
<http://eitgroup.com/>
- ▶ Tamarack Geographic Tech
<http://www.tamarackgeographic.ca/>
- ▶ Vox interactif
<http://www.voxinteractif.com/>
- ▶ Yield Communications
<http://yieldcommunications.com/>



NAVIGATION TECHNOLOGY

- ▶ Approach Navigation Systems
<http://approachnavigation.com/>
- ▶ MarineNav Ltd.
<https://www.marinenav.ca/>

GamePlan

Provincial coalition for the video game sector in PEI
<http://www.gameplan.ca/>
GamePlan is Prince Edward Island's strategy to develop, promote and diversify the video game sector in that province. GamePlan aims to bring together production and development studios, firms offering related services, post-secondary education institutions and developers as well as start-ups, particularly in the area of mobile applications.

Eigen Innovations

<http://eigeninnovations.com/>
▶ B2B provider of software solutions and quality and process control systems to the manufacturing sector (car manufacturing, food processing, mining, metal processing)

SOFTWARE – GAMES

- ▶ Ice Jam
www.icejam.com
- ▶ SmartMelon Games
www.smartmelon.com/
- ▶ Telos Entertainment
<http://telosentertainment.com/>
- ▶ Gold Sun Games
www.goldsungames.com/
- ▶ Silverback Productions
www.silverbackgames.com
- ▶ Xona Games
<http://xona.com/>
- ▶ Celsius Game Studios
<http://www.celsiusgs.com/>
- ▶ Other Ocean Interactive
www.otherocean.com/

TRANSLATION

- ▶ Alianco
<https://alianco.ca/>
Atlantic Canadian firm specializing in translation
- ▶ Transmed
<https://www.centretransmed.ca/>
Medical transcription, translation, analysis and coding



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- SME and serious game (8)

Knowledge economy



Learning through pleasure

Knowledge is recognized as a driver of productivity and economic growth. The term "knowledge-based economy" arises from the recognition of the role of knowledge and technology in modern economies; it is an economy based on innovation, both in modes of learning and in technologies.

It is the need to acquire skills, to maintain them and to adapt them which has led to the emergence of a "learning economy". Idriss J. Aberkane, a researcher affiliated with the Kozmetsky Global Collaboratory of Stanford University, talks about the knowledge economy. He describes it as an economy of love: one who loves something is more attentive and takes its achievement more seriously, and, ultimately, is more competitive. Being able to provide various means of disseminating knowledge that are more attractive, more effective, less costly and more flexible, can reach a wider audience.

The challenge of knowledge-based industries today results in innovation in terms of the design and the medium for learning. Play, in the context of E-learning, serious game or gamification, quickly became essential. Developed in all forms for all sectors, it becomes the spearhead of new methods of disseminating knowledge.

Major professional events for corporate learning :

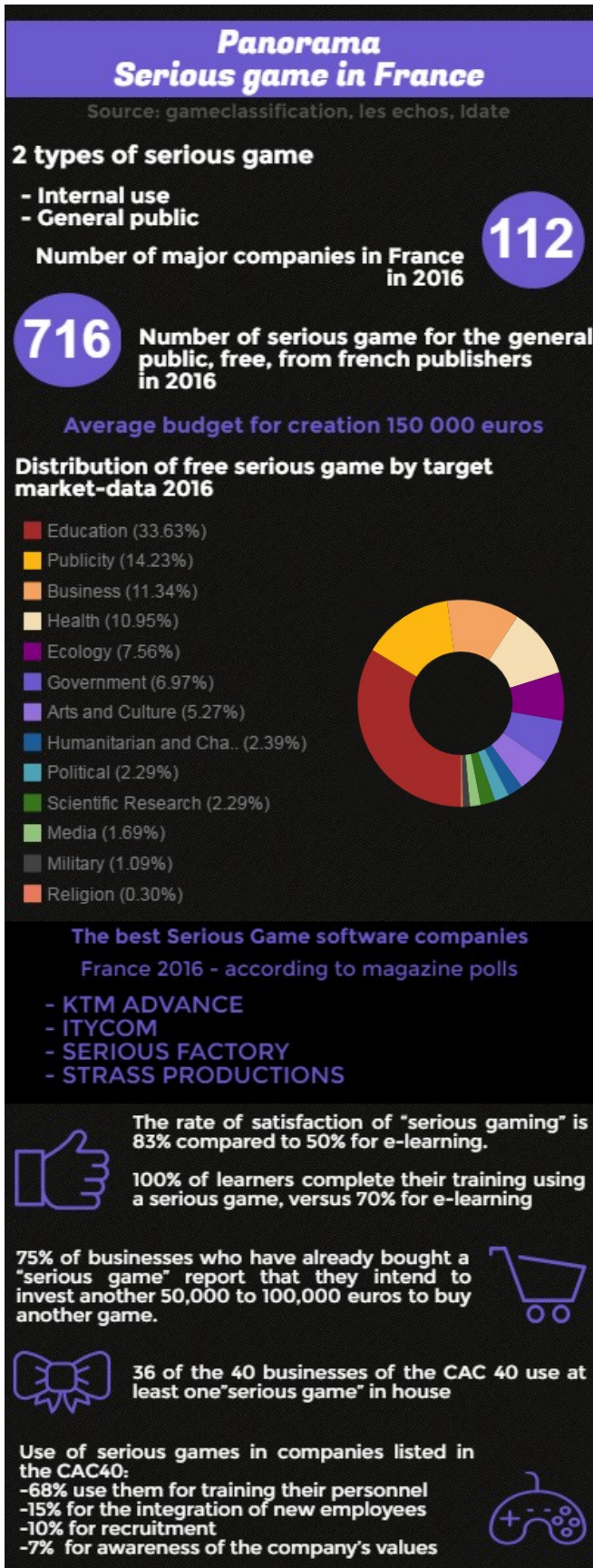
Paris - Espace Champerret	iLearning Forum Paris The No. 1 event in France dedicated to the technologies of individual and organizational learning	24.01 - 25.01 2017	www.ilearningforum.org
Lille - Grand Palais	Adult Education / International Training Trade Show Training, skills assessment, PLAR, creation or take-over of a company	10.03 - 11.03 2017	www.lavoixletudiant.com/salons/
Paris - Porte de Versailles	Performance and Talents A trade show focussing on tools and services for business leaders, and managers of human resources , training and information systems		www.solutions-ressources-humaines.com
	I-expo Trade show on information and market intelligence		www.i-expo.net
	E-Learning expo / Serious game Training and digital learning trade show	21.03 - 23.03 2017	www.e-learning-expo.com
	Intranet Solutions: ESN and Collaborative Intranet 2.0 and Enterprise Social Networks for Strategy, Performance and Productivity		www.salon-intranet.com
Paris - le Pré Catelan	HR Conference Conference for Human Resources Departments. Two annual meetings	29.03 - 30.03 2017	www.congreshr.com

source: OCDE, eventseye, économie de la connaissance Idriss J. Aberkane

Serious Game



New generation, new needs, new training systems



Serious Game is defined as the use of digital techniques and technologies and video games in an application whose purpose is to learn, train, educate or communicate. These tools are multi-faceted, and are involved in many areas. Some examples :

- ⇒ Learning a technique or skill
- ⇒ Facilitate communication within the company
- ⇒ Teach a corporate culture
- ⇒ Understand economic intelligence
- ⇒ Engage in collaborative research, advance progress

Serious game has become a true business market, bringing in 84 million euros in 2015. Serious games are used by 25% of HR Departments and training managers in Europe. 90% of the employees who tried them felt that they met their expectations and 87% of the learners liked learning by playing.

Public Strategies and Serious Game :

- ⇒ Pôle de Compétitivité Imaginove,
- ⇒ Pôle Images, Nord-Pas-de-Calais.
- ⇒ Le Serious Game Research Lab de l'Université de Champollion, région Midi-Pyrénées.

Business Directories by Region

www.game-in.org/index.php/fr/84-slider/75-annuaire
www.rhonealpesdigital.com/categorie-1/serious-game
www.bordeauxgames.com/categorie/membres/

120 developers and publishers, 3 000 jobs, thirty specialized schools: **Paris-Ile de France, European capital of video games** : www.capital-games.org

Education, Training and Serious Game

Used in all sectors, serious games provide added value to traditional learning by providing a "first experience in the field". Examples:

⇒ The GUILD, chair of "Serious Games and Innovation" of l'Ecole de la CCI de Grenoble, brings together 4 major activities: the creation of a collection of serious games for students and businesses, support for businesses in their innovation strategy using games, a research program and training of trainers in the design and facilitation of serious games.

⇒ Totally immersed in the game thanks to an Oculus Rift virtual reality-type computing device, IDSC and PYLA have designed and created a serious game of practical exercises for the students in photonics and lasers. This serious game technique for learning to manipulate an optical object is supported by the Aquitaine region and is the subject of European funding. Five countries are collaborating on this project.

E-learning and gamification



Learning differently

Companies are investing more and more in digital training programs that allow their employees to learn more easily and freely.

Increasing demand for E-Learning :

The market share for online education represented 2% of the total market in France in 2013, and is predicted to be at 30% in 2030. In 2012, a million people in France had already completed training online. The market is estimated at 200 million euros in France.

In higher learning : There are now 272 francophone MOOC worldwide. MOOC (Massive Open Online Courses) are platforms for online learning. Originating in American universities, they allow everyone to train online and interact with others for free.

Reference website: www.mooc-francophone.com
Higher education in France: www.fun-mooc.fr

In business : 84% of French companies with more than 500 employees use e-Learning. With an annual

growth of 25%, the LMS (Learning Management System) is the most popular technology in the e-learning market; 71% of French companies used it in 2014. It allows support and management of a learning process. There is also "blended learning" which combines online and face-to-face learning. E-learning allows reduced training costs, enhanced quality and effectiveness, but also makes it possible to reach a larger audience. The flexibility of training programs and schedules allows routine business to remain a priority.

Directories of companies offering training:

www.e-learning-infos.com/Tous.php?ELT=Societes
www.e-learning-letter.com/Tous.php?ELT=Societes

For further information:

www.e-learning-letter.com

Game dynamics several examples



Quests

Bring together intermediate challenges in order to attain a final learning objective



Experience points

Shows the learner's progress, can be used to "move up a level"



Rewards

Allows you to acquire certain bonuses or devices to progress in learning



Dungeons

A form of assessment to put in practice the knowledge acquired and to validate the learning



Multiple Lives

Allows the learner to make several attempts in order to succeed

Gamification:

Gamification is the use of games, with an objective that involves learning, performance or loyalty. Intended for employees, as well as for customers and suppliers. Grading system, awarding points ... motivate to create commitment and improve outcomes. Gamification applies the principle of knowledge-based economy that states that the more entertaining an activity is, the greater the investment and motivation, and therefore the better the results.

Examples of the integration of gamification: Cloud Slicer.

Cloud Slicer, developed by AIRFRANCE S.A, allowed travelers from certain Asian airports travelling to Paris to play a game on a smartphone before takeoff, in order to win an upgrade to business class. This communication and customer loyalty campaign was intended to make waiting an opportunity for travelers on AirFrance.

A combination of a behavioral study, marketing and entertainment, gamification continues to gain momentum, in everyday life as well as at work.

For further information:

www.frenchweb.fr/tag/gamification
www.seriousgamesindustry.com/FR

Gamification Festival:

Nantes Digital Week - 09/2017

Atlantgames cluster - several events per year

Sources: FrenchWeb, SkillRoad 2013, Afinef 2014, IDATE

SME and Serious Game



Focus on training courses offered by KTM advance

Everyone has a Serious Game and there is a Serious Game for everyone:

The L'Oréal group produced Reveal, a serious game designed to introduce students to their professions. Renault trains its dealers to sell its vehicles mainly through a serious game system. Société Générale uses OnMap to explain its processes and its organization. But serious games are not only meant for big companies. To offset the financial issue of the cost of the customized design of a game, some publishers offer games off the shelf (which are not custom-made but adaptable to different companies) to reach a wider audience. With one main objective: the training of staff.



KTM Advance, one of the European leaders in this sector:

The company offers 6 courses that deal with cross-functional themes that can be of interest to all companies. 75% of these training systems are available internationally in over thirty languages.

Portfolio of courses:

⇒ **Boost Your Sales**

"Boost Your Sales" permits learners to develop their potential in these six areas : Listen actively, explore needs, discover motivations, ask questions, deal with objections, and conclude a sale.,

⇒ **Adopt the "Client Attitude"**

The Adopt the "Client Attitude" course was created to develop the employee's potential in these six areas: welcoming the client, understanding the client's needs, answering and making a sales pitch, closing the meeting, managing any follow-up, and adopting key relational attitudes.

⇒ **Finance, for Non-Financial Managers**

"Finance for Non-Financial Managers" develops the learner's' potential in these five areas: balance sheet (holdings), profit and loss accounts (performance), cash flow (WC – WCR – CASH), MIS (diagnosis), and talking "Finance".

⇒ **Annual Performance Review**

The "Annual Performance Review" course develops the learner's potential in these four areas : preparing for the interview, understanding the implications of the interview, conducting the interview, and having a constructive dialogue.

⇒ **Management Meetings**

Online training allows you to develop your skills as a manager regarding your business expertise and your relational postures, using two modules: Communication - assertiveness and active listening and Business - organization and management

⇒ **IT Security**

This on-line training develops the learner's potential in these four areas : recognizing threats, evaluating risks, responding appropriately and discussing with the CIO, whether you are at your desk, travelling for work or at home in your own private environment

Website: www.ktm-advance.com/welcome/

Information: commercial@editup.fr

KTM Advance regularly participates in national and international conferences to present its vision for the future and its innovative solutions for distance learning.

Moving forward: Play can also help advance progress. Danish and Finnish researchers solved a problem of quantum physics using "citizen science". They transformed their unsolvable problem into a video game and studied the behavior of the players.

Science citoyenne en France: www.inra-dam-front-resources-cdn.brainsonic.com/ressources/afile/320323-7bb62-resource-rapport-de-la-mission-sciences-participatives-fevrier-2016.html

INTELL-ECHO



Are you seeking business opportunities in this sector?
CACIMA and FCCC-AN can facilitate your business prospection process and help with establishing new partnerships
(targeted information and network contacts)

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