

19. “The Multi Business Model Innovation Brain”

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ABSTRACT

Businesses have until today put most emphasis and practice on human leadership of Business Models and Multi Business Model Innovation. However, advanced technologies integrated in Business Models and Multi Business Model Innovation processes introduce a new leadership and management agenda. Fast development of sensorsoring, persuasive and virtual Business Models will soon be operating autonomously primarily by machines. Businesses will be able to, build Multi Business Model Innovation competence and advanced Multi Business Models Innovation Brains capable to innovated and operate Business Models in even different types of Business Model Ecosystems. This will change the classical way of how business performed leadership of Business Models, operated and innovated Business Models. It will also open up to new Multi Business Model Innovation potential and create a new generation of Business Models, new practice of Multi Business Model Innovation.

The paper is a first attempt to propose a conceptual Multi Business Model Brain and How it could operate supported by advance wireless and sensor technologies. The paper discuss how the Multi Business Model Innovation Brain can be evolved and how artificial intelligence technologies, deep learning, persuasive technologies, Multi Business Model Innovation pattern analysis and archetypes will be important supporting tools to the Multi Business Model Innovation Brain.

Keywords: *The Multi Business Model Innovation Brain, Advanced Business Modelling, AI, Deep Learning, Business Model Innovation, Sensors, Persuasive Technologies, Physical, Digital, Persuasive and Virtual Business Models*

INTRODUCTION

In today’s digital age artificial Intelligence (AI) and Deep Learning (DL) in a world of persuasive business models (BM) [2] could potentially propose all possible archetypes of BM’s. Multi Business Model Innovation (MBMI) Processes and corresponding interaction archetypes patterns of any BM interactions can be carried out with

- Human Intermediary BM Interaction
- Machine Intermediary BM Interaction
- Mix of Human and Machine Intermediary BM Interaction

MBMI patterns analysis, MBMI Library combine with AI and DL could potentially support a MBMI Brain in its leadership and management of BM’s and MBMI in any Business Model Ecosystem (BMES) Interrelated BM Interaction.

There seems therefore to be enormous potential of constructing a MBMI Brain embedded, supported and operated with AI, DL, MBMI pattern analysis, MBMI Library and advanced sensor technology. Many businesses are trying already to do this (AMAZONE, FACEBOOK, GOOGLE, APPLE), but the majority of businesses are just able to “seeing”, “sensing” and realizing MBMI in a classical human based MBMI form.. These businesses are mainly – compared to the above mentioned - capable of using very simple BMI tools and frameworks – often “of and from the past”. These businesses are leading MBMI not supported by machines. This puts them into a very critical position in the future, when larger and larger part of MBMI is taken over by machines and machines that can work especially faster than human brains.

These businesses MBMI approaches and tools seems not capable and able to “tailor made” MBMI fast and flexible enough in a world of 5 and 6G. They have very large difficulties to adapt to BMES’s and BM’s that change very fast. They are in other words not prepared to lead BM’s and MBMI of the future – meeting competition with changing, persuasive and virtual BM’s. They are not advanced enough to support creating,

capturing, delivering, receiving and consuming the real potential of MBMI and related BMES [3] in the right time, to the right cost and at the right performance [11]. However, there seems to be a lack of knowledge about MBMI Brains constructions in these businesses – and *How could a generic MBMI Brain be constructed?*

A CONCEPTUAL MODEL FOR MBMI BRAIN INTERACTION WITH BM'S AND BMES

A conceptual model for a MBMI Brain's environment were earlier described in our article - Advanced Business Model Innovation Supported by Artificial Intelligence, Deep Learning, Multi Business Model Patterns and a Multi Business Model Library [8]. However, the construction of the MBMI Brain was not covered and the article did not provide an overview of the requirements to a MBMI Brain. In this articles we intend to increase the approach to cover a combination of digital, virtual and physical representations of BM's supported by a MBMI Brain.

Conceptualizing on the perspectives to construct and implement a MBMI Brain, in this context, will mean explaining the vision of the MBMI Brain construction. How it will be able to create, capture, deliver, receive and operate BM's with a mix of human and/or machine interaction physically, digitally, virtually, simultaneously and autonomously. The MBMI Brain could hypothetically - at an optimum - propose and operate any BM in any BMES anytime, anywhere to anybody and anything. A conceptual model in figure 19-1 shows the MBMI Brain working in its Business Model Ecosystem (BMES) together with MBMI AI, MBMI Machine Learning and MBMI Deep Learning. MBMI Library and MBMI Pattern analysis support and continuously update BM's archetypes and combination of BM's based on the "learning" gain through the interaction with BMES's.

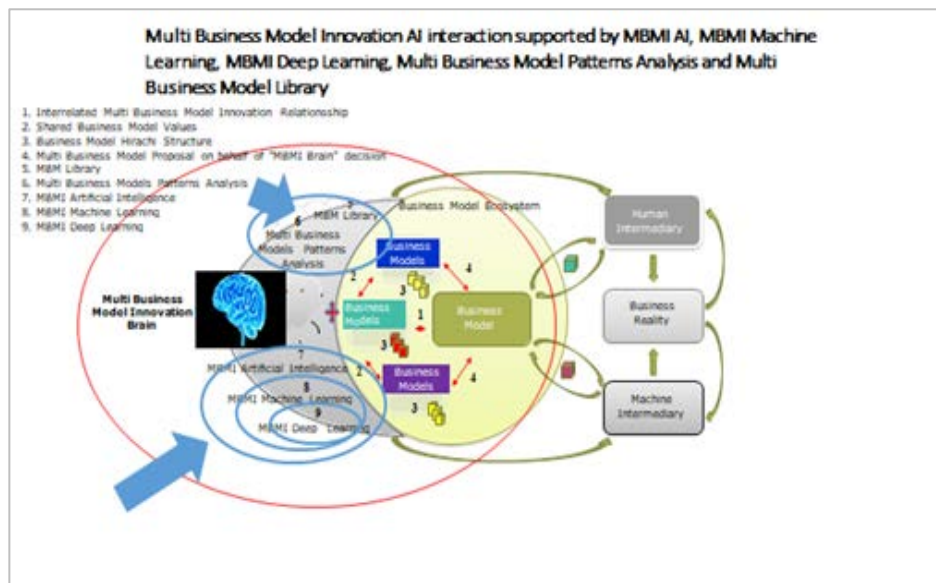


Figure 19-1 The MBMI Brains Interaction with Business Model Ecosystems with Human and Machine interaction inspired by [1], [6], [8]

THE MBMI BRAIN

The MBMI Brain is as proposed earlier [8] supposed to be supported by MBMI Artificial Intelligence (AI), MBMI Machine Learning, MBMI Deep Learning (DL), a MBMI Library and MBMI Patterns analysis. These parts are expected to be special "centers" and "tools" placed outside the core MBMI Brain. Human and/or machine based sensors interacting in the BMES business reality – "at the frontend" in the BMES - as indicated in figure 19-1 with the red circle continuously operating known BM's and learning new BM's. Sensors adapt and transmit sensor data to the MBMI Brain through tangible and intangible relations. These parts lays outside the core MBMI Brain and the MBMI Brain operate on behalf of these data transmitting backwards and forwards through the MBMI's Brains relations to the Business BM's in the respective BMES's. MBMI AI, ML and DL algorithms help to optimize and suggest change of existing BM's and help propose new BM's directly to the responsible

person or/and machine in the business to pass on to e.g. the user and/or customer. Based on other BM's success in other BMES's MBMI AI, ML and DL algorithms will support implementing of change into the business reality based on its analysis carried out together with the MBMI pattern analysis and available BM's and combination of BM's in the MBMI library.

A. MBMI Artificial Intelligence (AI)

MBMI Artificial Intelligence we define as a broader umbrella under which MBMI Machine Learning and MBMI Deep Learning come. In Fig. 19-2 we sketch how we expect MBMI AI, MBMI Machine Learning and MBMI Deep Learning are related with each other and interact with the MBMI Brain.

Inspired by Poole [14] AI can in relation to MBMI be defined as the study of "intelligent MBMI agents": any MBMI device that perceives its BMES and takes actions that maximize its chance of successfully achieving its Business objectives".

Inspired by Russell [15] and Kaplan [24] we further developed AI related to MBMI by characterizing MBMI AI as "a MBMI system's ability to interpret external data from the BMES and learn from such data to use those learnings to achieve specific objectives and tasks through flexible adaptation of the offered BM's".



Figure 19-2 the MBMI Brains Interaction with MBMI AI, MBMI Machine Learning and MBMI Deep Learning inspired by [1], [6], [8]

Artificial Intelligence related to MBMI can be called MBMI machine intelligence in contrast to the MBMI human intelligence displayed by managers responsible and caring out MBMI. The term MBMI AI can be used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving" related to MBMI [16]. As machines become increasingly capable of operation MBMI, tasks considered to require human "MBMI intelligence" are removed from human MBMI Managers to machines. Hereby also, inspired by the literature on AI true MBMI AI can be defined as

"whatever BM and combination of BM's that hasn't been done and introduced to the any BMES yet"

and then is moved to hypothetically machines. Inspired by McCorduck [17] "the MBMI AI effect" is yet extremely difficult to machines to carry out 100% as it includes elements that still distinguish humans to other species and machines. MBMI AI – we propose can be divided into three different types:

- Analytical MBMI AI
 - Analytical MBMI AI has characteristics consistent with cognitive intelligence; generating a cognitive representation of the BMES and using learning based on past BMES experience, BM archetypes and MBMI to form future MBMI decisions.
- Human-inspired MBMI AI

- Human-inspired MBMI AI has elements from cognitive and emotional MBMI intelligence; understanding human emotions, in addition to cognitive elements, and considering them in their decision making on BM and MBMI.
- Humanized MBMI AI
 - Humanized MBMI AI shows characteristics of all types of competencies (i.e., cognitive, emotional, and social intelligence), is able to be self-conscious and is self-aware in interactions.

The challenges of MBMI AI research include MBMI- reasoning, knowledge representation, planning, learning, language processing, perception and the ability to change and manipulate BM's and combination of BM's – persuasive multi business modelling [18]. General MBMI intelligence is among the MBMI Brains field's long-term goals [7] including MBMI statistical methods and patterning, computational MBMI intelligence, and traditional MBMI symbolic AI. Many tools is expected to be used in future MBMI AI, including versions of search and mathematical MBMI optimization, artificial MBMI neural networks, and MBMI methods based on statistics, probability and economics – including both monetary, nonmonetary and mix of such value propositions and value formulas. The MBMI AI field is expected to be a cross interdisciplinary field and will draw upon computer science, information engineering, business mathematics, business psychology, business linguistics, business philosophy, business intelligence and many other fields related to MBMI.

The field of MBMI AI is found on the assumption that human MBMI intelligence can be so precisely described that a machine or more machines together can be created to simulate humans “MBMI Intelligence”. This raises, however a philosophical discussion about the nature of the mind and the ethics of creating “MBMI artificial beings” endowed with human-like MBMI intelligence. These issues has not been explored yet much by myth, fiction and philosophy but we consider MBMI AI to be a potential danger to MBMI human driven business, if it progresses unabated. Others believe that MBMI AI, unlike previous technological revolutions, will create a risk of mass unemployment. [19]

In latest years, MBMI AI techniques have developed and experienced a resurgence following and supported by concurrent advances in computer power – quantum computing, access to large amounts of data, and increased BM theoretical understanding; evolving MBMI AI techniques have become an essential part of yet a limited group of some businesses. However, AI in MBMI has been lacking behind and is still on a very early stage that has to be developed further in the next coming years.

MBMI Deep learning can be defined inspired by [39][20][21] as deep MBMI structured learning or hierarchical MBMI learning and can be regarded as part of a family of MBMI machine learning methods based on MBMI artificial neural networks. MBMI Learning can be supervised, semi-supervised or unsupervised. Deep learning MBMI architectures such as deep MBMI neural networks, deep MBMI belief networks, recurrent MBMI neural networks and convolutional neural MBMI networks can be expected in the future to be applied to all fields including MBMI machine based vision, audio, speech, taste, smell, sound and feel recognition [4]. MBMI language processing, MBMI social network filtering, MBMI machine translation, MBMI bioinformatics, MBMI design, MBMI medical image analysis, MBMI material and service inspection, where they will continuously produce BM proposals and combination of BM proposals comparable to and in some cases superior to human MBMI managers [42][43].

MBMI Artificial Neural Networks (MBMIANNs) can be inspired by information processing and distributed communication nodes in biological systems. MBMI brains could have various differences from biological brains. Specifically, MBMI neural networks tend to be able to be static and symbolic, while the biological MBMI brain of most living physical Businesses and BMES should be formed as dynamic and analog inspired by [22][45][46].

B. The MBMI Library

The Multi Business Model Library is proposed to consist of two parts

- A library of Business Model Archetypes
- A library of Archetypes of combination of Business Models divided into 3 categories

- Incremental – small changes in BM dimensions and combinations of BM’s [13]
- Radical – Radical changes in BM Dimensions and combinations of BM’s [13]
- Disruptive – Disruptive changes in BM Dimensions and combinations of BM’s [13]

The Multi Business Model library will host or be a memory like a “MBMI knowledge home” including all previous known BM archetypes and combination of BM and their construction related to BM portfolio, BM dimension and BM component level as seen in figure 19-3 beneath.

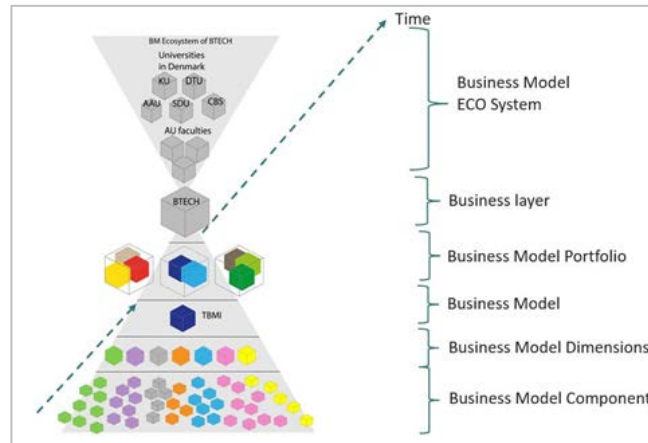









Figure 19-3 Levels of MBMI and combination of BM’s Inspired by Andersen et al [12]

Table 19-1 The Multi Business Model Library

 The Multi Business model Library	Incremental	Radical	Disruptive
Business model archetypes [28].			
Archetypes of combination of Business Model's [17].			

The MBMI Library will continuously learn and adapt new archetypes of BM’s and new archetypes of combinations of BM’s. Today there is still very little solid literature and knowledge on generic BM’s and combination of BM’s, which could help us or in the future machine based MBMI Brain to identify best possible BM archetype to any specific BMES context.

Literature on combination of BM’s is still lacking and this is something that is important to be added to the existing BM literature and our conceptual model [8]. There is further very little research on lifetime of BM and combination of BM’s over lifetime related to BMES context. The choice of generic BM and combination of BM in a certain life stage of a BM, combination of BM and BMES is highly interesting to investigate.

C. The Multi Business Model Patterns Analysis

The Multi Business Models Patterns Analysis is expected to consist of:

Existing known MBM pattern typologies

A MBMI pattern is a set of MBM data that follows a recognizable form, which MBM analysts and tools then attempt to find in the current data. A pattern is a regularity in the BMES, in human-made, machine-made or a mix

of Human- and Machine-made MBM design. The MBM pattern typologies will be able to support choice of BM and combination of BM related to lifetime of BM and BMES. In abstract, the MBMI Pattern typologies will give support to the MBMI Brain on how a MBMI design could look like on behalf of the available MBM data and BMES context. As such, the hypotheses is that the elements of a pattern of the life of a BM or a life of a combination of BM's – could repeat in a predictable manner. A MBMI pattern is a kind of pattern formed of “geometric shapes” of the lifecycle of a BM or the lifecycle of a combination of BM's and typically repeated like a typical BM or combination of BM's life cycle design. Any of the senses of the MBMI Brain model embedded in the BMES as shown in fig 19-1 may directly observe or register valuable pattern data for MBMI pattern analysis.

MBMI process typologies.

The Business Model Innovation (BMI) process typologies inspired by Taran [9] – Open proactive, Close Proactive, Open Reactive and Closed Reactive BMI process typologies - can be identified for single BM's. BMI typologies are hereby already available today but MBMI process typologies for innovation of combination of BM are however not available today and still needs to be investigated to find out

- What different MBMI process typologies exists?
- How businesses can design new, novel and innovative BM's in combination?
- open proactive, close proactive, open reactive and closed reactive and not least defensive MBMI processes inspired by Martins et all 2015 [10].
- Combinations of BMI typologies is far more complex to classify and study than single BMI, because it is like leading a chess game with many pawns, where single BMI process are just played with one pawn.

THE MBMI BRAIN'S CONSTRUCTION

Some basic characteristics seems to be vital to be present inside a MBMI Brain.

- A. The MBMI Brain must be able to sense data, operate and make decisions on behalf of these data, which it receives from where the BM's meet and interact with other BM's in their respective BMES - the business reality as shown in the conceptual model fig 19-1.
- B. The MBMI Brain must also be able to act on - what is really going on in the BMES and how the BM is performing. Sensor data will include valuable information that the MBMI Brain must be able to receive and capture from sensors – either human or machine based sensors.
- C. The MBMI must have tangible and intangible relations to sensors embedded in the BMES and BM's to be able to receive data – “values” – from the sensors.
- D. The MBMI Brain must be able to work with the data and create new data to the BM's. These data have to be delivered back to the BM's again through the tangible and intangible relations so they can be received and consumed by BM dimensions.
- E. The MBMI Brain must be able to download, see and sense MBMI data in real time. It must act as a “downloading”, “seeing” and “sensing” – “organ” – and at the same time be able to “calculate” – and do algorithms on behalf of MBMI data given, delivered and available. On behalf of these deliver back communication and change request to BM's in realtime.
- F. The MBMI brain have at the same time to be “creative” and be able to create and capture new or changed data to later value its business BM's in the respective BMES's. The last is considered a difficult part to fulfillment of the MBMI Brain - a very difficult request that up to now have only been reserved and possible for humans. The MBMI Brain should be able to address broad, open-ended and ambiguous BM problems like developing competitive business model strategies.
- G. The MBMI Brain has to be able to ” act and do” on behalf of its MBMI Brain process and let the solution and related data be transmitted and communicated back to the BM's in the BMES.

The complete MBMI process that the MBMI Brain must be able to take care of and operate on are shown in fig 19-4.

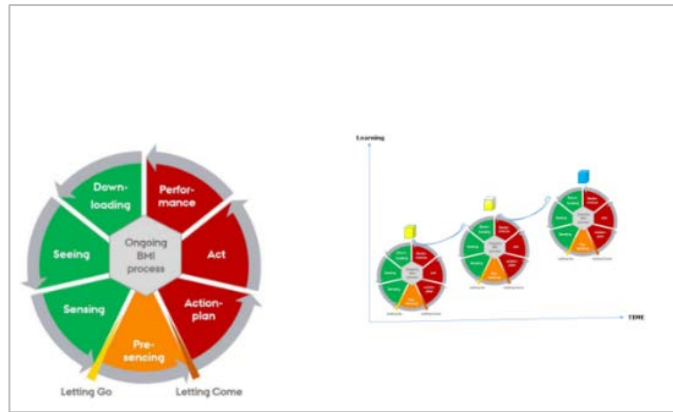


Figure 19-4 MBMI Brain Process inspired by Andersen et al [23]

As can be seen in the figure 19-4, the MBMI Brain has to be able to continuously improve and innovate the value proposition of the BM to the user or/and the customer in accordance to what it learns from the interaction process.

A simplified model of a pure human bond MBMI Brain process and a pure machine based MBMI process are explained with 2 case example in figure 19-5. for an insurance BM case including two BM – one BM for police signing and one BM for repair and for a cosmetic BM case in figure 19-6.

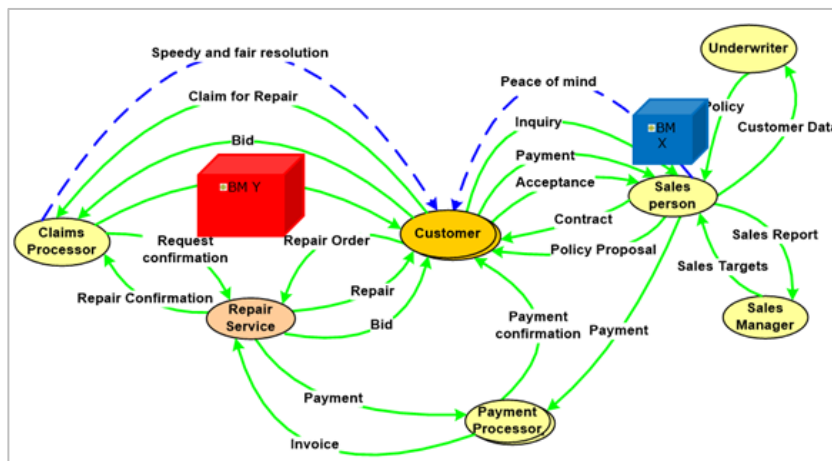


Figure 19-5 Two BM's on an insurance business operating with tangible and intangible relations to the two BM's receiving and sending data (values) backwards and forwards between the insurance business and the customer

In the above shown example the two BM are operated as pure Human based MBMI process “using the Brain” of a two humans (claims processor and sales person) to act-do and lead the two BM's operation and MBMI process. However, it could be equally operated as a machine based MBMI operation and process. The role of humans hereby will play a diminish role in business modelling and in their place machines, algorithms and “passive MBMI management” will become more and more important. Practice.

L'Oreal one business that have entered this new MBMI praxis as it expanded in 2019 its Virtual Try-On Service BM to adapt the trend to become among several cosmetics businesses turning to augmented reality and artificial intelligence to boost sales and its business models value proposition.

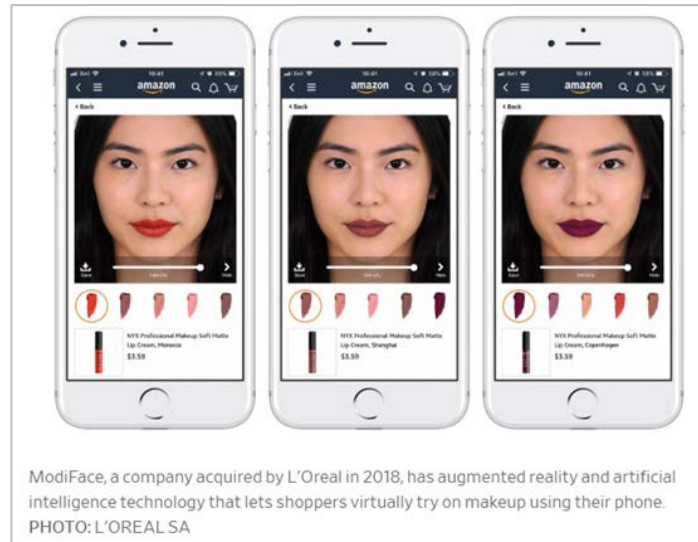


Figure 19-6 pure machine based MBMI process embedded with Augmented reality and AI is shown [24]

L'Oréal's U.S. subsidiary rolled out this BM that lets shoppers use their phone's camera to simulate various hair-color shades from L'Oréal products Garnier Nutrisse and Garnier Olia using augmented reality technology. Using the Google Lens image-recognition mobile app, made by Google Inc., shoppers can point their phone cameras at the hair-color boxes to activate the virtual try-on service. The application identifies the product and color and then activates the virtual try-on service, powered by technology from ModiFace, a business that L'Oréal acquired in 2018 for an undisclosed amount. Customers can use the feature anywhere the two Garnier products are sold, but 500 participating Walmart Inc. stores will have signs near the products demonstrating on how the virtual try-on service can be used. [24]. The last showing an example of a mix physical, digital and virtual value proposition output of a mix human- and machine based MBMI operation and process.

When online and in-store customers use the advanced technologies that lets them virtually try on in this case beauty products before purchasing them, L'Oréal have seen three times the rate of customers purchasing their BM's. L'Oréal has been working with Modiface's augmented reality technology since 2012, and decided to buy the business after coming to appreciate its potential and considering this technology to be a critical MBMI competence to have for L'Oréal in the future.

"We realized that AR and AI would really change the consumer experience for L'Oréal and the BMES," L'Oréal Chief Digital Officer Lubomira said. "We decided that partnership was not enough. We really wanted to source that competence and capability internally." [24] Another example of how we can expect business at the core business level to be changed on the competence level.

"It is difficult to determine how certain products, especially hair color, will look on a person until they try them on. There's a real advantage to guiding your consumer to find the right color," Ms. Rochet said.

And while retailers may offer makeup samples in stores, customers might not have time to try on multiple shades and wipe them off, or they might not want to experiment with samples that have already been used. 'Oréal is among several cosmetics businesses turning to augmented reality and MBMI AI to boost sales. Cosmetics retailers that offer similar virtual try-on services include Ulta Beauty Inc., which recently acquired two startups that specialize in augmented reality and AI, and Sephora, owned by LVMH Moët Hennessy Louis Vuitton SE.

Sales for L'Oréal between January and September of 2019 were about €2 billion, up by about 8% compared to the same period in 2018. The business said in October that one of the main drivers of growth was increased e-commerce sales, which grew about 49% during the first half of 2019 compared to the same period last year. In other words growth in sales is in both the physical and the Digital BMES of the cosmetic BMES. Shoppers are spending more on L'Oréal products online, partly thanks to ModiFace's technology.

A customer using the ModiFace tool typically tries on more than 20 different shades of makeup, Ms. Rochet said. Clicking a “try on” icon next to a product lets the app use the customer’s laptop or phone camera to generate a preview. Simulations of makeup and hair color have gotten more true-to-life with advancements in quality of the camera on smartphones, as well as processing power in the phones, said Parham Aarabi, chief executive of ModiFace, “It took a long time for the technology to get better,” Mr. Aarabi said.

Websites such as Amazon.com Inc. and Sephora also allow shoppers to virtually try on L’Oréal makeup products including lipstick, eye shadow and foundation using ModiFace’s technology, Mr. Aarabi said. The same feature is also offered on in-store tablets at bricks-and-mortar stores including Sephora.

The ModiFace technology uses an AI system called a neural network technology to automatically identify parts of the user’s face and apply the right shade of makeup on the right part of the face. Mr. Aarabi said. The AI systems also analyze the background lighting to simulate the makeup color correctly. Neural networks are composed of layers of interconnected artificial “neurons” that automatically learn about the features of a specific object based on large amounts of training data.

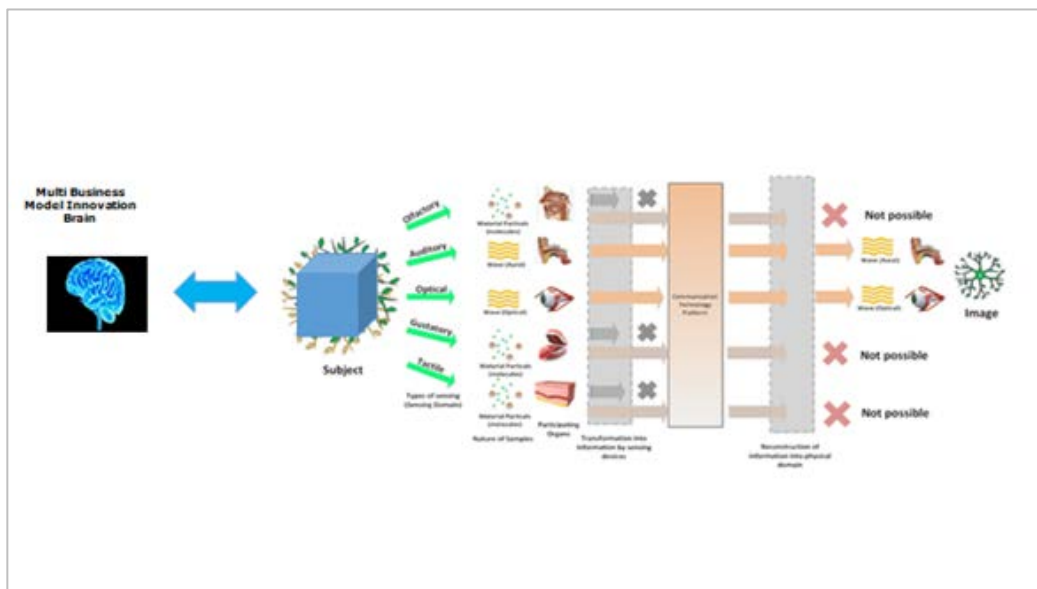


Figure 19-7 Machine supported MBMI brain process with a mix of human and machines based MBMI leadership, management and advanced sensor technologies inspired by [26] [27] [28]

Reports from other BMES in September 2019 document the same trend e.g. that the pot of passive equity assets MBMI operation and process measured at a stock of \$4.3 trn exceeded that operated by humans [25]. The ability to create such MBMI systems with multiple layers has led to advances in several sensor technology research areas e.g. speech recognition and computer vision. Still we have not identified pure machines based “MBMI brain’s” that are able to sense all 5 senses. Smell, taste and touch is still a challenge but several research labs are experimenting with these sensors to be built in to BM’s. In figure 19-7. we show an example on how we conceptual expect future MBMI brains to operate including all senses in the near future.

A. How can the MBMI Brain be inspired by The Human Brain?

A first inspiration to construct a MBMI Brain could naturally be adapted by studying and imitating one of the most advanced sensing organs in our world – the human brain. The human brains sensor part and its ability to downloading, seeing and sensing its environment and even its own body – and not least its creativity part – where the human brain do the sensing part of the MBMI process – is a very good basis and inspiration for the future constructing of a MBMI Brain. The Human Brain make the human and the body act and do through relations and make the body live its life as its “strategy moves” along its life. The human sensors measurement systems helps continuously the human brain to measure the human bodies performance – “downloading” and “seeing” - let it

interacts according to and with the environment, machines, spaces and humans around – “sensing” and “act and do”. This is “at first glimpse” a perfect competence and capability to adapt 1 to 1 into the MBMI Brain. As an inspiration an illustration of the human brain is shown in figure 19-8. , showing the brains 5 critical senses – smell, hearing, touch, vision and taste.

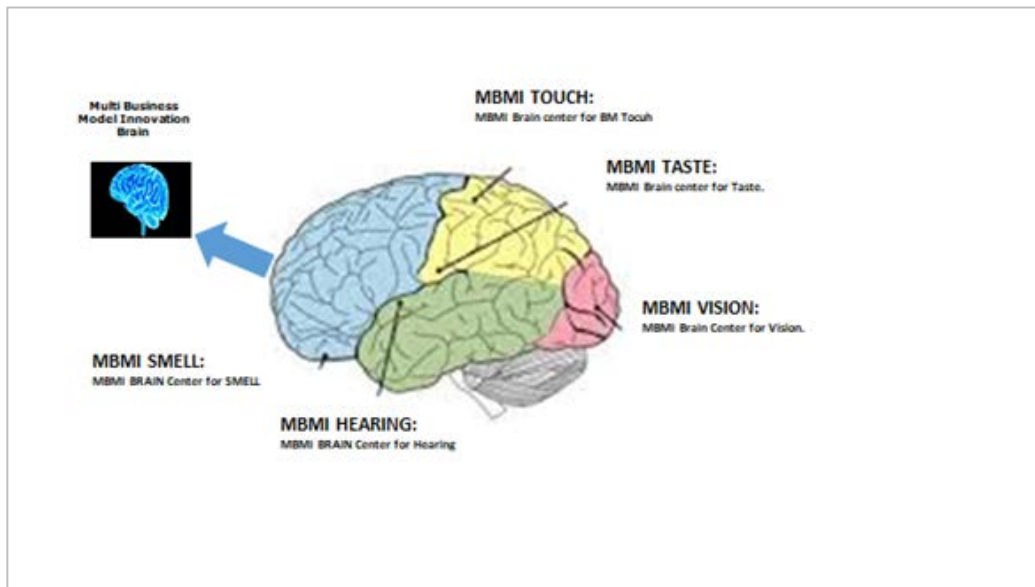


Figure 19-8 The MBMI human brain and its 5 sensing centers [29]

The human brains 5 sensor centers that each receive, capture, translate, analyze, create and deliver sensor data is a good starting point and vision for the construction of the MBMI brain. A manifold and different types of “human sensor centers” receives data from sensors placed different strategical places in the human body and support the Human Brain with performance measurements – e.g. data for touch, taste, vision, hearing, smell. The human brains sensor centers and the sensors collaboration enables the brain to “understand” and “react” on all kinds of sensor data. However the MBMI Brain together with its sensors could potentially be constructed even more advanced in the future to become more intelligent and different than the Human Brain. In other words overcoming the barriers, weaknesses, threats and limits of the human based MBMI brain – combining the advantage of the human and the machines competences and capabilities.

Drawing an analogy to our proposed future MBMI Brain construction - we propose in this construction attempt that the MBMI Brain has initially the same sensors, sensor centers and communication systems, competences and capabilities built into the MBMI Brain construction as the human brain.

With its 5 sensor centers that will be able each to receive, capture, translate, analyze, create and deliver sensor data from both human and machine based sensors it will allow the MBMI brain to have more advanced sensor functionality than the pure MBMI Human Brain as it would be able to access more data as the human MBMI brain and managers brain have and can access. At the same time when supported by quantum computers the MBMI Brain will even be able to operate faster than the pure human MBMI brain.

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One of the core difference to humans compared to other species and yet also machines is that humans can be creative. According to David Englemann [30] humans have a little expansion of the cortex part in front of its brain and human brain got a lot more of it than other species. That lets to more space between input and output,

which means that humans take more time to work with the in and out data – “thinking” - about the data in- and output before it act. Other species are much more reflective.

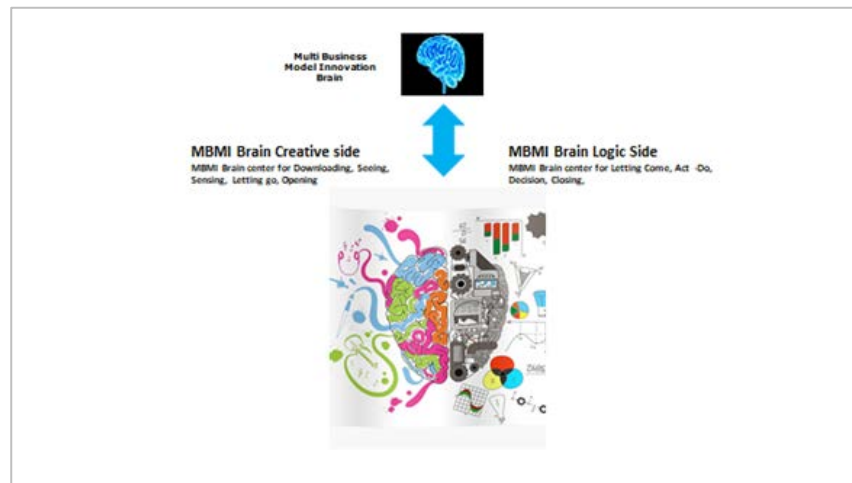


Figure 19-9 The creative and the logic side of the MBMI Brain embedded inspired by Reebooble.com [47]and Saghaug et all [56]

The Human Brain enables humans “to unhook from time and think about future” – “simulate What IFs”. Humans are constantly rehearsing, trying out and predicting possibilities. This enables humans “to let its hypothesis to die in its head” [48].

“Creativity is the humans biological mandate” [48]

Humans when creative – or doing MBMI - actually spend very little time on here and now. However research, shows that todays business managers and employees spend very little time on MBMI and strategic MBMI, because they are forced to and taught to spend most time on operation, routines and daily work. Some of previous findings shows that many businesses spend 85 – 95% of their time on operational task.

Data sensed by humans “gets matched up” with other things and what comes out is constantly what the human brain spin out of the world around – the BMES that the BM is living in - and is experienced by the MBMI Brain. Humans continuously keeps doing this process in the same way if they are not forced or motivated to do opposite – which we can construct the MBMI Brain to do. This is what we call “pushing the MBMI process to go the opposite way as the clock does” and basically push the cognitive process the opposite way in 3 MBMI processes:

1. Binding
2. Breaking
3. Blending

In the construction of a MBMI Brain we need to consider how to develop a platform to enable the MBMI Brain to do so - both in the creative and the logic processes. We have to construct the MBMI Brain to go “opposite way as the clock” which is yet not possible to do by machines and often very difficult for many human brains, as they most often try to “drive” the easiest route. However, there is no easy route to the best MBMI Brain construction and the superior BM’s. MBMI Brain activity demand high focus to the human brain and demands. Much energy has to be provided to power the MBMI Brain processes. Measuring the brain activity in the brain when sensing or working with something new or different shows clearly that MBMI Brain activity requires access to much energy. We therefore also have to consider from where and how to power the MBMI brain.

If we continuously keeps on learning the MBMI Brain our past and “feed” it with both the human and machines knowledge one basic fundament or platform for creativity and creating “bobbles”, ideas, concepts, prototypes is established. Equivalent to what the humans brain in an MBMI Manager can do, if they have skills for this and are well trained. Knowledge – and most bobbles and ideas – some say all – are created generously out of our past

knowledge – and learning. New bobbles and ideas does not come out of “the blue sky”. Every bobbles and idea evolves and have a history to it – are based on learning.

That’s why it is important that the MBMI Brain can “download” the business and its related BM’s history to create the fundament for the new or different BM and also “see” from the outside its history and impact on other BM’s. It is the basic for MBMI learning – “the raw material” to all MBMI.

“What we do with machines is that when we stuff data into them they come out later with data on that”

The human brain is however nothing like that [48] and a future MBMI Brain should not be constructed just as a machine that we stuff MBMI data into and it then just come out with data on that. It should be better and much more advanced – and more advanced than the human brain and definitely todays machines brain.

Therefore, let’s begin our approach on the MBMI Brain construction by downloading, seeing and sensing all the advantage of both humans and machines “brains” together and then merge these observations and build on the top of this knowledge. The aim is to create a new Brain – A MULTI BUSINESS MODEL INNOVATION BRAIN – that is better, faster, more flexible and dynamic – and strategic smarter.

B. How can the MBMI Brain construction be inspired by “machines brains”?

When Advanced machine based and related sensors embedded in each BM start acting in the different BMES – the BM’s environment together with AI and Machine Learning will provide us with mega data. These data can be put into computers – or machines – and then they can analyze these and come out with results according to the rules or programs put into them or “learned them”. The sensors can be attached to and embedded in humans, species and/or in machines as part of the one or more BM’s operating in the BMES as indicated in figure 19-10.

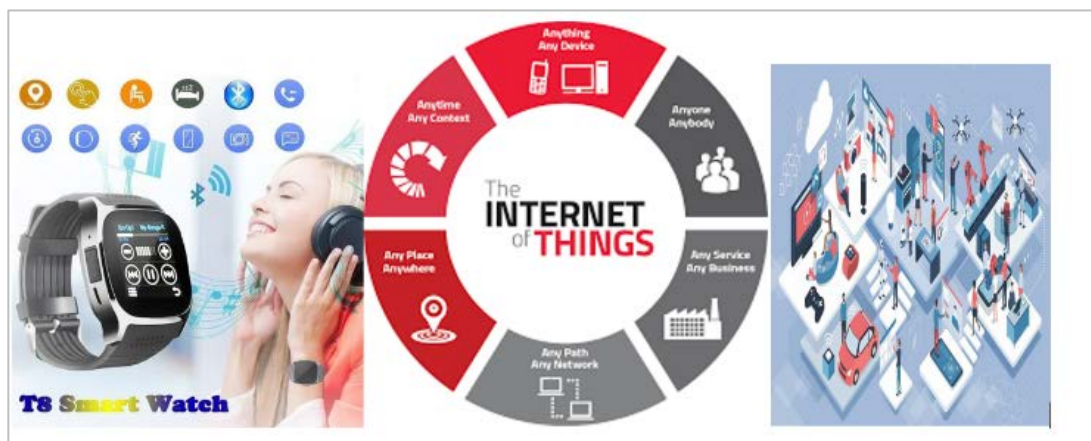


Figure 19-10 Sensors embedded in any Business Model with anything, anyone, anybody, any place, any time, any context inspired by [31],[32],[33]

With AI, machine learning and deep learning the machines can begin to learn more and come closer to be what is regarded as being intelligent. The MBMI Brain has however to communicate, navigate and sense continuously through tangible and intangible relations as shown in figure 19-5, enabling that the MBMI Brain receives and delivers data. The relations are however maybe the most important and vital to the construction of the MBMI Brain. The MBMI Brain has to be able to receive and deliver data – and value to the BM’s though the relations. If the MBMI Brain and its related BM’s are constructed with autonomous and intelligent sensors that are able and allowed to act autonomously, then the value proposition capturing, creating, delivering, receiving and consumption process can take place decentralized or autonomous to the MBMI Brain – but only if there is relations. The MBMI brain can hereby save time and can focus on receiving and/or delivering data e.g. to change strategically a BM or change a combination of BM’s. The MBMI Brain can be constructed to use more time to strategic leadership of MBMI than human management and operation of MBMI

As the MBMI Brain becomes more and more advanced through continuous MBMI learning, it will be able to take over more and more MBMI tasks – and even strategic tasks of MBMI from the human management responsible for MBMI. Thereby not just do routine MBMI tasks, but also advanced dynamic, persuasive and virtual MBMI tasks. This will increase the speed of changing or innovating the BM’s and combination of BM’s even more. The human being will be challenges on MBMI to keep up with speed of MBMI but also to think out strategic best choice of a BM construction and/or combination of BM’s. MBMI practice will face a situation equal to when big blue played the chess game against the world champignon chess player Mr. Garry Kasparov 22 years ago.



Figure 19-11 Picture 1.: and Picture 2.: Mr Garry Kasparov playing and loosing to the IBM Super Computer Deep Blue

In defeating Kasparov on May 11 1997, the machine called “Deep Blue” made history as the first machine to beat a human world champion in a six-game match under standard time controls. Kasparov had won the first game, lost the second and then drawn the following three. The computer was continuously learning and updating its “knowledge home” – exactly what we expect the MBMI brain will be able to do in the future. When Deep Blue took the match by winning the final game, Kasparov refused to believe it - what we could expect business managers also will do when the MBMI Brain is reality and really come into operation in the near future.

It appeared that AI 22 years ago had reached a stage where it could outsmart humanity – at least at a game that had long been considered too complex for a machine. Bigdata, MBMI AI, MBMI ML, and MBMI DL in combination 22 years later combine with MBMI library and MBMI Pattern analysis lead by a strong, rigid, un human like commitment to cold, hard logic in a MBMI Brain have already begun to demonstrate human creative style of thinking and learning [30]. The application of MBMI simple rules on a grand scale seems already to have been reached in some businesses and BMES – especially in ICT, ecommerce and social media BMES. The face of Kasparov’s emotional behavior in Picture 2 seems soon also to be reality for managers responsible for businesses MBMI, if they do not convince their businesses to invest heavily in MBMI Brain technology to support them in their MBMI processes.

As more and more business will realize and accept that MBMI has to be carried out differently and to use MBMI constructions with MBMI Brains - future MBMI will expectively become quite disruptive, more dynamic, agile and faster related to previous MBMI forms and types. This will eventually adapt more risk to the businesses [31]. However the risk of MBMI will become less if the different MBMI Brains commence to act with incremental MBMI [23] under controlled forms. If the MBMI Brains begins to act autonomously then the MBMI process can in worst case get out of control.

DISCUSSION

Sensors, wireless, persuasive, AR and Virtual technologies in businesses everyday MBMI will change BM and BMES - and will continue to develop exponentially [4] and create new types of MBMI. Numerous software and sensor innovations attempt to enhance the MBMI creating, capturing, delivery, receiving and consumption process and capability. When an internet user googles some BM of interest – shoes, sailboat, house for sale – the MBMI Brains have already for several years analyzed the data received from the sensors and few seconds later pushed promotion not just on the first website – first BMES - entered by the user but also to several other websites – BMES’s - that the user enters afterwards. In figure 19-12 and illustration of this is shown where

the MBMI BRAIN of German Lloyd business push BM value propositions through newspaper BMES (BT) e-newspaper, music channel (Youtube BMES) webpages, E - Shopping Mall (Boost.com - BMES) and direct through own loyalty E-commerce site (Lloyd.com).

How will these frameworks, tools and persuasive BM’s impact and enable managers responsible of MBMI to do better and more strategic MBMI in the future? When advanced technologies [6] and advanced MBMI Brains “melt” and work together - meaning that BMs will act anywhere with anybody, anything, anytime and in any BMES – either physical, digital or virtual. Hereby the potential for business MBMI Brain increase tremendously because the individual BM’s value proposition becomes more tailor made to the user, customer, network partner and not least the Business.

By the introduction of a MBMI Brain construction, it will be possible to play more and more advanced “games” of MBMI – and faster MBMI games. The MBMI Brain would be able to combine the business different BM’s and play them together in the best value formula combination in the preference of the business. This has previously been carried out by managers responsible for MBMI – like a football manager setting the team and shifting the players through the game in accordance to how they perform, how they performed together, how the opposite team played the game and how the game proceeds.

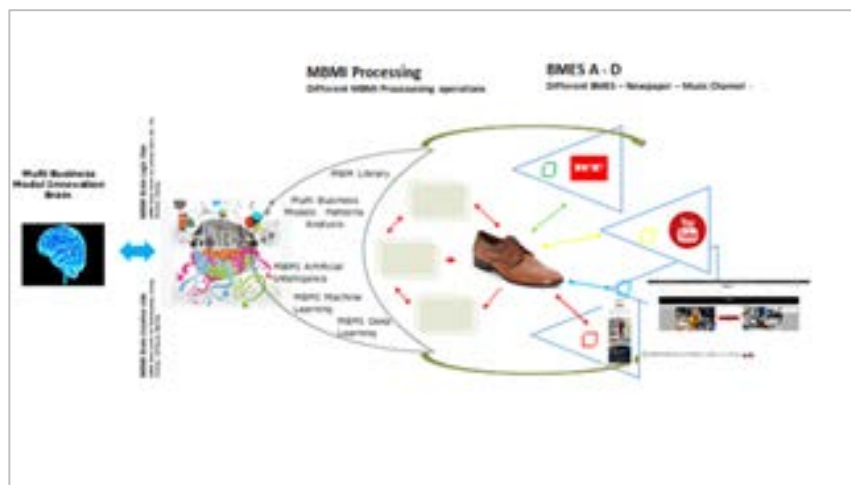


Figure 19-12 Illustration of MBMI Brains working in different BMES

A MBMI Brain would change the MBMI game from purely human controlled to machine based controlled – or even a combination of human and machine based MBMI leadership. One effect of implementing a MBMI Brain is that the potential to the individual business increase as it is now able to offer the business BM’s to a larger group of users and customers in the BMES – but even also to vertical and horizontal BMES [24]. If different MBMI Brains collaborate - complement each other even also including competitors acting together [24] – acting in coordinated swarms of BM’s - then the user, customers and network will be able to experience better, more advanced and more precise value propositions. In other words “the cake” becomes larger and the BMES increases or even melt together.

The BM community will definitely be pushed to adapt MBMI Brains and related advanced technologies to be able to act faster, change strategic mindset more often and technological MBMI setup within split seconds. While the advance MBMI technologies grows mature, businesses will be more and more dependent on their MBMI Brains setup. That will enable them quickly to get a deep understanding of how BM’s and BMES really works and is expected to work in near future – and do the MBMI Pattern analysis together with choosing the most suitable BM archetype.

Businesses have continuously to know how their BM’s are operating (AS IS BM’s) and how they should be constructed (TO BE BM’s) and this makes business very dependent on the relations to the BM’s and the sensors embedded in their BM’s. That is the reason why we see heavy investments in advanced sensor technologies integrated with wireless technology systems [25]. Businesses have to continuously know how and what their BM’s really can “do and act”. Simulations of BM’s and combinations of BM’s becomes hereby important MBMI support tools together with AI, DL, MBMI Pattern analysis and MBMI library.

The proposed conceptual model consists of the MBMI AI, MBMI ML and MBMI DL section, which represents the interaction between MBMI DL patterns analysis, the BM and combinations of BM's, the humans and the machines. The Multi Business Model Library will over time, consist of all existing known Business model Typologies, typologies of combination of BM's and typologies of MBMI processes within the business – a “Knowledge Home” for MBMI. This is equal to the chess player Mr. Kasparov or Deep Blue computer from IBM – who and which based their play on their knowledge in the human brain and Deep Blues knowledge.

A MBMI Brain will become required competences of many Businesses in the future and when fulfilling this requirement – also eventually become a core competence to some businesses [26]. The Multi Business Model library, The Multi Business pattern analysis, MBMI AI, MBMI ML and MBMI DL systems surrounding the MBMI Brain will continuously adapt new types of business models and combination of Business Models. They will be “learning” MBMI as they operate. From the above mentioned the conceptual model for the construction of a MBMI Brain must have 4 key supporting sections as described above:

- “Artificial Intelligence
- “Deep Learning”
- “Business Models patterns analysis
- “Multi Business Model Library”

The MBMI Brain – inside the MBMI Brain – must also have “sensor center” or more sensor centers. System(s) taking care of the reception and processing of sensory information. Information - received through “the MBMI Brains relations” in the conceptual model, and directly to the centers of the brain exposed to the values running forwards and backwards through the relations to the BM's and between BM's.

The MBMI brain will be able to receive, interpret and deliver information from its special senses responsible for vision, smell, hearing, taste and touch. However, the MBMI Brain is challenged as it has to deal not just with one sensor signal, but with mix motor and sensory signals. These have to be integrated and understood by the MBMI Brain as the MBMI brain will receive data and has to send data back coordinated from and to a mix of BM's. The last “bit” is challenging – and would expectedly also be why one MBMI Brain could be developed to be more intelligent than another one – and hereby perform core competence to one business related to other businesses.

Though, we fully recognize that much more research has to be carried out to extent our understanding of the MBMI Brain's construction it gives us a hypothetical basis to begin experimenting and do verifications on the different proposed components and prototypes of the MBMI Brain. At the same time more archetypes of AI and DL for MBMI, add to archetypes of BM, combination of BM's, MBMI process archetypes as a kind of MBMI knowledge home will be verified and possible to add and built finally the first MBMI Brain. On behalf of AI, DL, Multi Business Model Innovation library and Multi Business Model patterns analysis we are however just in the very beginning of building and understanding the foundation of a MBMI Brain in our new CGC LAB. Our own estimate is that it will take another 3 – 5 years to develop a functioning construction of a prototype of the MBMI Brain including sensor and relations.

CONCLUSIONS

MBMI Brains support by AI, DL and advanced sensor technologies are and will be increasingly developed and integrated in Businesses BM's and MBMI operation. This will created not just a new generation of BMs but also new combination of BM's – never seen before. With the support of MBMI Brains businesses will be able to find BM's archetypes and combinations of BM's not seen before.

The MBMI Brain will allow development of BMs operating and innovating autonomously in all types of physically, digitally and virtually layers of the business, BM, combination of BM, MBMI processes and BMES. Hereby the agenda and practice of MBMI will change disruptively and humans and machines will come to play a very different role together in MBMI – with more power to the machines and MBMI Brains. The paper in this context elaborated on a conceptual model for how a generic MBMI Brain could be constructed and how it could look like. Different examples/illustrations/analogies to human brain and other brain constructions were discussed

to show how we expect future MBMI Brain and operations will be constructed and operate. The paper describes the importance of the relations of the MBMI Brain – relation between the MBMI Brain, its expected sensor centers and its supporting tools, knowledge centers, BM’s and The MBMI Library, The MBMI Pattern Analysis center, AI, ML and DL. If these tangible and intangible relations cannot be created, captured, connected and opened for value transformation then the receiving and consumption process cannot take place.

The MBMI Brain is expected to be “the central organ” – or “spider” - of any business in the future and a vital part of its “nerve system”. With the manifold of tangible and intangible relations forming the value transformation system in “the business internal and external nerve system” the MBMI Brain strategically will lead all MBMI activities of the business. The MBMI Brain will take care of all MBMI processing, integrating and coordination of the information it receives from related sensors. The MBMI Brain will analyze, create and deliver value back to each BM’s dimensions and components – either it is human and/or machine based BM’s and make decisions as to the instructions sent to the rest of the business as illustrated in figure 19-12.

FURTHER RESEARCH

In our review of the current multi business model innovation literature and the previous proposed conceptual we found a gap in current body of knowledge, even the current understanding of the MBMI process have not been investigated to its full extent. We propose a further study, supported by the advanced technology and MBMI Knowledge in our Global spread CGC Lab’s, in understanding the MBMI Brain, its environment and the success factors, before extending the MBMI process with any further digitalization factors. Secondly, we propose to use the output of the previously suggested study in conjunction with the proposed MBMI conceptual model [1], [2], [8] and extend the MBMI process with further digitalization in the areas of interaction archetypes and interaction archetypes patterns of the conceptual model. We will further investigate the impact of the exponential growth of these BM’s and advanced MBMI technologies discussed in our future research at the MBMI and Technology research lab at CGC.

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