Artificial Intelligence Implications for Business Strategy: "Constructing a Strategic "Road-Map."

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Abstract— This paper is a written effort to present the construction of a strategic "road-map," which in its turn could serve as a business template for any entrepreneurial effort in the field of algorithmic trading in the financial markets and the corresponding demand for such products and services. The current status of the relevant technology and its possible short-term future, embodied in a business organism, are considered by the examination of the potential impact and importance of AI technologies. Simultaneously, the maximization of collective intelligence, namely the best form of partnership between a human and a machine, is pursued through the distribution of their roles and their day to day interaction. This interaction results in penetrating the market with the creation of high-quality products (aka robotic trading advisers), and by the adaptation of the appropriate business strategy.

Index Terms— Artificial Intelligence, Machine Learning, Natural Language Processing, Robotics, Business, Porter's Generic Strategies, Organizational Processes, Industry of Financial Products and Services, Algorithmic Trading, Collective Intelligence.

1 Introduction

In the midst of technology evolution and its main – sometimes exaggerating- caused public's reactions, it may be monetarily beneficial to examine possible exploitation of this current social trend in society's taste for high tech applications. The current paper serves this cause, by the author's effort to produce a strategic "road map" as a possible guide for an entrepreneurial initiative in the field of financial products and services, especially in designing, producing, distributing and supporting robotic processing automation software -in a form of a final product- in the trading -using mechanical trading strategies- industry. Initial assumptions as the existence of "Saint Thaddeus Robotics Ltd," which is a fictional startup company to encapsulate his vision for penetrating the above mentioned specific segment of the market demand for robotic algorithmic trading solutions, and the author's trading experience, have been made.

In the following sections of this paper, through this implied "road map," the prerequisites needed in the set of "know how's" in technology and management, are demonstrated. Artificial intelligence[1] as the fundamental tool for the creation, support, and marketing of this company's potential product lines, the impact of such technology deployment is examined via a detailed reference in the organizational processes[2] of "Saint Thaddeus Robotics, Ltd." Furthermore, by implementing Professors Michael Porter[3] three generic strategies, the author opts to achieve a competitive edge in his company's ways of business conduct, and thus to justify the suggested initiatives. Specifically, a "high return – low risk" business model of "a one man to one machine" collaboration is chosen, while the tradeoff that this choice brings, namely a presentation of a non-general entrepreneurial model[4], is accepted. Finally, potential impacts/risks of this business model in the human part of the working force of the company were investigated and conclusions regarding the adequate criteria of success of this business endeavor by following the suggested "road map," have been extracted, analyzed and presented.

The goal of this written presentation is twofold: first, is to serve any possible readers' general interests on the topic of robotic solutions in trading the financial markets and the current state of supply and demand side regarding these RPA's products. Second, by following a mixed, "light[5]" scientific/business approach, the author try's to produce a reference template for all whom they may be keen to follow a similar path of entrepreneurial action.

2 Drawing the Road-Map

2.1 Current State

Let's assume, the existence of Saint Thaddeus Robotics, Ltd. which is a startup company and its primary goal is to create, supply and support robotic systems of automated trading transactions. The company's ambition is to acquire (even an incremental) market share of investors whom they prefer not to assign to an external money manager the "fate" of their risk capital and thus to avoid triggering an inherent conflict of interests[6].

So how this company would be able to take a share in this market[7]?

[1] Deployments of machine learning, natural language processing and a possible involvement of robotics, are examined.
[2] Working, Behavioral, Growth and Change Processes.
[3] https://en.wikipedia.org/wiki/Michael_Porter
[4] The author sacrificed generality (inference) for reality (practical usage).
[5] Meaning that no "heavy duty" mathematical rigorous descriptions, has been made to support the author's proposals.
6https://www.investopedia.com/terms/p/principal-agent-problem.asp
7 A well-known portal for mainly the retail portion of the market can be found in https://www.mql5.com/en/market

How will it be able to survive and evolve? To find an answer to those above (over crucial) questions, we need to understand the critical role of the company's ability level to exploit the *already existing* related technology in this field. Also, to be able to find *unique* and even *unrecorded* ways of producing "turkey" solutions -in the form of electronic applications- for the investment and *particularly* for the *trading* community. That fact implies that the manager's - employees of the company have to be on top of computer science (code developing), essential statistics for AI, the potential traded market microstructure, quantitative modeling, financial based theoretical models and their applications in practice, the role and behavior of the most important "game players" e.g., trading price makers, broker-dealers etc. Besides, they also need to know about the market's environment (traded and the supply side for trading utilities/solutions); namely, it is commercial limits which the existing regulation poses.

Based on the above said, should be everyone's first impression that the constant cost of this startup company will be enormous. However, this is a *wrong* assumption. *So here's why*: One man (for example the author), with the adequate experience[8] and the preexisting investment in Human Capital, can very well handle all the above business prerequisites if he uses current AI applications to serve them!

Moreover, this one single human handler needs only a set of (well known in the industry) AI computer software applications, to store and follow all the adequate data involved with the creation, testing, limitation, maintenance, marketing, and after-sales service support. So here comes the "collective intelligence" aspect: he has to be well "married" with his hardware and software to embark his entrepreneurship voyage.

However, maybe these are not such good news for Saint Thaddeus Robotics, Ltd. The reason why that is almost everyone can buy these software products and invest time and effort to educate him about the tricks and trades of this market. Technology limits the barriers to entry in that market, enhancing a fierce competition[9]. What it was nearly impossible ten years ago now it is very accessible and feasible. *The good news* is that *if* this fictional organization manages to invent a well-presented trading system following a business strategy based on *differentiation and focus* to the particular group of the market (retail and small scaled accredited investors[10]) has many probabilities to survive, evolve and finally succeed.

To summarize and conclude, maybe it did not be emphasized enough the *fact of the facts: AI technologies are the pillar of this company's future.* However, it is also rather than obvious that *if and only if* the notion of collective intelligence (the "marriage" between human and machine data handlers) exists, *then and only then* this synergy of a human and a computer will lead to innovation and innovation will lead to product differentiation. Combine all these with the adaptation of the *focus to a particular side of demand* for such applications as a business strategy- and maybe we have a recipe for success.

2.2 Proposed Initiative

Looking at the current state of ML, NLP and robotics information technologies, and projecting their evolving acceleration in the near future, this strategic "road map", should prompt the company under consideration to engage in the following initiatives (categorized by the proposed adoptions regarding each of the above mentioned AI technologies):

Machine Learning

So let's go back to "Saint Thaddeus Robotics, Ltd." What should its policy concerning the use of ML be to have the most efficient synergy aka "collective intelligence" and of course the desired results? We can identify the following organizational processes including sub-tasks in each of them:

Production Process: Un-doubtfully, the "heart" of the company's business. ML is of immense importance being the technological cornerstone of the following tasks:

- finding new trading systems through the application of Genetic Algorithms,
- b) implementing various techniques to confirm their performance and most importantly robustness,
- combine them to a portfolio of trading systems-robots and, finally
- extract that portfolio into a "ready to use" trading robot without the user of the ML programming application needing to write a single line of code(!), saving enormous amounts of human's time and effort.

Quality Checking: An ML-based API will check the final product regarding programming bugs, and therefore it will expose the main weaknesses of the final product if any. Of course, this process will also reveal the appropriate strategies for dealing with influences coming from external sources of control, namely concerning factors from the end user side, such as the product's behavior to possible internet connection problems, Virtual Private Servers restarts, and even the end consume's probable mistakes of using it. The conclusions of the QC should be included in the final product's user guide.
Marketing and After Sales Service Support: The company (through its human manager) will decide which of the AI and ML external applications that are currently applied in the cyberspace, will use-exploit to promote its products, distribute them accordingly and be able to support them making the life of the end consumer easier. For example, it has to be a human decision of which internet portals will use exploiting their ML-based applications to establish a market share. Google search engines are the most applied tool. However, there are some alternatives also. Especially for after-sales service, the company will use its personal cyber market internet portal constructing an ML-based Q&A API through which any client (or po-

[8] The author does not want to exaggerate here...It is true that not anyone can do this, but it is not *for anyone after all*. If it were, it would be no profit margin by default.

[9] There's a different approach which has to be reminded: Information technology changes the way to compete, FW McFarlane - 1984 - academia.edu.

[10] https://www.investopedia.com/terms/a/accreditedinvestor.asp

tential one) will make the company know about his problems and queries, again saving vast amounts of human labor time.
The vision for the company is to establish a presence in the part of the industry of financial services which has to do with the supply of "turnkey solutions" in algorithmic trading. The above will achieved by aiming high at the quality level of the final product, its user-friendliness, and after-sales services support. Based on the above high-end descriptions of synergy between ML applications and the company's main processes and sub-tasks, it has been more than clear that in the industry which "Saint Thaddeus Robotics, Ltd." is aiming to be a part of, AI (through ML applications) has the role of the central pillar.

Now, viewing things from a strict business perspective and taking in mind Porter's framework, ML will help "Saint Thaddeus Robotics, Ltd," to:

1. Save human resources and thus the immense cost which will be their by-product.
2. Save time resources which are so scarce in this brutally antagonistic field.
3. Imply the best allocation of human-machine synergies and roles (Collective intelligence optimized). These characteristics will be readily recognized and enforced by an experienced manager.
4. Exploiting technological ML programming applications for making a truly innovative series of products. Thus ML will enhance differentiation and therefore make an inelastic demand curve for them.
5. Exploiting external ML technologies to promote the end products to the particular side of demand which they addressed to, and could be easily penetrated considering a low-cost budget marketing plan.
6. The end products, with the decisive help of ML, will be designed in such a way that could be used by an even novice trader or the trader who does not have the time nor the motive to understand what is "under the hood." Therefore, this aspect of ML will lead to a more focused approach of the market which "Saint Thaddeus Robotics, Ltd.," will try to penetrate and take a stable over time market share.

Many readers, at this point, would question the reality percentage in the above business strategy. Their main argue could be "*how and whom can apply in reality such an ambitious plan for a start-up company? At the end of the day, how could this company confront others which have been in the industry for many years and their R&D budget is relatively enormously high?*" Well, the answer will be straightforward: "*Spend smart, not hard.*"

Well established companies pay the cost of their brand name and their *X - inefficiency*. Being humongous doesn't mean that you are operating efficiently. Besides, these companies are paying the cost that they were leaders and the people which worked with them from the start demand more returns as depreciation of their added value. Finally through Porter's *focus* "Saint Thaddeus Robotics, Ltd" will not aim to penetrate their markets. Billions of dollars have been spent during the recent decade to generate High-Frequency Trading infrastructures and they sure -some of them- were good investments. However, for a single one man's start-up company that won't have such expensive expansion visions this kind of R&D and human resources costs will not play any role in its business existence nor that they will also be needed.

The plan is to exploit the meager cost of specific already existing auxiliary AI applications in order to deploy all the above said about the fundamental processes of the company, namely the human handler and his machines will be bonded to produce, check, verify, evaluate, supply, market and being accountable of the success of this aforementioned business chain. As we have mentioned in the context of the "Current State" paragraphs, it is considered that he has all the adequate and prerequisite human capital to employ and combine the relative sciences for this cause, namely mathematics, applied statistics, software engineering, hardware knowledge, business economics and most importantly there should be a live trading experience accumulated over at least a fifteen years, time span[11]. This fact only can make this man understand what a trader would need and expect from such products and his believe that he knows the market and the company's competitors. Ultimately, he knows who the "big boys" are and where he and the rest of this market's competitive fringe[12] should stand and what should avoid.

Last but not least, he also believes that he knows almost all the glitches and the technical obstacles that may appear in the way. He has paid high tuitions along the way...The primary goal is to succeed in conveying his personal know how to this start-up company, and he is aware that he has to be prepared to confront all the endogenous and exogenous risk factors concerning the deployment of relatively new technology to an -always- "old-fashioned" market.

Definitely a lot of "he's and him(s)[13]" were written above. And they have been so intentionally. The final ones will be posted in the following questions "Is he too ambitious"? Is he too overconfident"? These questions would and should have an answer after the first four quarters of the business life of the company. The risk is minimal compared to the value of the potential returns, and we can assume that he firmly believes that he has to take it[14].

Natural Language Processing

[11] The Author has this experience recorded.
[12] *"On Forchheimer's Model of Dominant Firm Price Leadership"*, Attila Tasn´adi, Department of Mathematics, Budapest University of Economic Sciences and Public Administration, H-1093 Budapest, F˝ov´am t´er 8, Hungary∗ January 5, 2004. Appeared in Economics Letters, 84(2004), p. 275-279.
[13] The use of the mail pronoun "he" does not imply any anti-feminist message or stance.
[14] In the three last paragraphs a lot of weight of the human's set of capabilities has been given. It is obvious that without these assumptions, namely high level of human capital the whole plan wouldn't be possible.

As indicated in the previous parts of this "Strategic Map," applying innovative ML technologies is the *core* of creation of "Saint Thaddeus Robotics Ltd." Since NLP (and GNL) is a very significant "branch" of ML and DML, let's examine how a possible NLP related technologies implementation may affect its main organizational processes[15]:

- **Work Processes:**

    1. Production - design and implementation: *NLP brings many new ideas on the table:* **What if** a new product will be a trading robot that will be created based on NLP's capability to summarize and "understand" news sentiment?[16] Instead of having the (sometimes novice) trader trying to create scenarios or understand, summarize and interpret the underlying message for the market coming from these mega-events, the machine does that for him. Moreover, it does them much more objectively correct, and *so faster*[17] than him. **What if** a trading robot would be created to serve as a *teacher*, *counselor*, *critic*, *potential competitor* or even *a manager* of a not so disciplined trader? Using the unique aspects of NLP software to mimic a human presence, deploying text and speech interactions with their human users, it may sound strange initially, but this creation could be an excellent companion in his so many hours of isolation[18].

- **Behavioral Processes:**

    1. Communication Processes- After Sales Service and Support: To market and support its products, "Saint Thaddeus Robotics Ltd," should and would adopt and apply the existing external sources of NLP applications (proper ads, proper World Wide Web presence, and proper online and offline collection of data). Besides "Saint Thaddeus Robotics" will deploy "in-house" templates based on NLP applications in its' production series of trading robots.

- **Change Processes:**

    1. Transformation and Growth: The above mentioned present the proposed actions that NLP will generate and augment for the company and that will determine its *visible* presence in the corresponding industry. However, *internally*, since "Saint Thaddeus Robotics, Ltd" will have only one human employee at the start, his interaction with NLP and its results in the processes mentioned above will create a value-added experience for him as a designer, manager, marketer and supporter of its products. Therefore it can be safely hypothesized that this fact in its turn will crucially affect the way he will face managerial decisions in such a case that the company grows and will demand (some few) desk seats from the labor market.

Company's vision is to establish a presence in the part of the industry of financial services which has to do with the supply of "turnkey solutions" for algorithmic trading. The above will achieved by *aiming high at the quality level of the final product, its user-friendliness, and after-sales services support*[19].

In the above framed context using AI applications and in this case its particular branches of NLP and GNL, and since "Saint Thaddeus Robotics Ltd", is not a non-profit organization but it aims to earn "dollar votes" from the market in order to maximize its shareholders utility, Mr. Porter's generic strategies would be taken in consideration.

Hence, through NLP usage, the company will aim to:

I. Positively affect ***differentiation*** by releasing unique products augmented by NLP's attractiveness with its potential human users.

II. Positively affect ***differentiation*** by constructing trading robots that may be seen from the market not only as the "cherry on the top of the cake" but be a part of the cake itself, meaning that will be an effective enhancement in trading performance. Allow me to give the following parallelism: *The Xmas tree needs decoration, but Xmas celebrations need a tree.* For example, the idea of a trading robot that will automatically execute trades based on news and announcement extracted sentiment which the robot itself will interpret *it* can generate a real and long-lasting trading edge[20].

III. Positively affect ***focus*** *by broadening its constraints and well define them without adding significant production costs* and *marketing costs*. Of course and the company will try to exploit the existing NLP based market penetrating tools to a specific category of traders. However, this is something that any other company does, and most of the times without being able to support it. *Overexposing* a company to the market may lead to *adverse* business effects. Therefore a set of well stored, measured, analyzed and classified quantitative or categorically variables coming directly from raw commercial market data using NLP applications by giving them a distillery role, is the way to

[15] In this part of the paper a more formal segmentation of organizational processes is given as shown in https://sloanreview.mit.edu/article/the-processes-of-organization-and-management/

[16] In the FX world, news announcements as NFP, CPI readings, interest rates announcements and related comments of the most influential Central Bankers, and elections' results are the movers and shakers of the market.

[17] FX

[18] https://www.amazon.com/Disciplined-Trader-Developing-Winning-Attitudes/dp/0132157578

[19] I don't like to repeat myself yet this statement represents exactly my vision for "Saint Thaddeus Robotics, Ltd," so there was no meaning to rephrase it. Hence, to avoid any self-plagiarism, I have to report that this paragraph has been originally written to define my "vision" in my previous assignment for ML.

[20] Informative transactions speed combined with the appropriate hardware infrastructure is one of the "not enter" doors for the retailer in the Spot FX market. Saint Thaddeus Robotics, Ltd., role will contribute even to a tiny fraction to change the "is" word of the above phrase to "was."

do it. For example the idea of a trading robot used as a teacher, competitor or even *a manager* for **discretionary**[21]Traders are ***focus*** changing because it's broadening the market to a "family" of traders that have some aversion towards strictly mechanical and automated trading systems. The implied cost for the company is minimal compared to potential rewards coming from this.

Before expanding by whom, how and when this proposed initiative would take place, let us don't forget that "Saint Thaddeus Robotics Ltd" is a "low risk-high reward" aiming business effort. Of course, the "low risk" term comes from a dollar spending resources perspective. Therefore, the human handler will be the one that he will plan, execute and be accountable to the company for the implementation of the above said. His knowledge of the technology-related practices and market-related practices are enough (for the time being). He knows that his creation will be a "one parent-kid", but he don't have the luxury for a partner[22].

The inclusion of NLP's power to the company's production artillery is a strategy that will help a lot the differentiation aspect of its related supply. Viewing things from a strictly IT angle, MQL4, MQL5 and Python computer languages that will be deployed in coding "Saint Thaddeus Robotics Ltd", robotic advisors, provide many "ready to use" libraries for this cause, but until now strangely enough according to the author's knowledge and research no developer combined them intensively[23]. Giving a text message or even a voice message it is not so costly from an IT resources perspective taking in mind that there are many evolving third parties which can make a difference on this within logical costs.

The "know-how" requirements are the following: a very well structured database, a very good knowledge of the aforementioned programming languages, a very good knowledge of applied statistics in data science, a proliferate use of the existing applications and templates that may help to the main cause, an immense experience of the market reaction's by trading them (both mechanical and discretionary) and most of all the right pick of external third parties-"partners" for applying NLP's advantages to the most and that is for creating and train the appropriate ANN base so he can adapt it as a template and incorporate it in this particular category of my future robotic products.

Other technical considerations of this business initiative may be the compatibility of the existing trading platforms with the code of the products being enhanced by NLP applications.

[21] https://www.marketgeeks.com/discretionary-or-mechanical/ it's a bit of "folkloric" but a useful reference.

[22] Cost constraining reasons.

[23] Maybe because a significant percentage of the existing developers of algorithmic trading "experts" are focused on earning money as fast as they can, cause hope is the last thing which dies in a trader's heart or maybe because they are IT guys and not economists / financial engineers.

Until now we can't see any "fail from the birth" paradigm which can make the human entrepreneur to abort the NLP incorporation in "Saint Thaddeus Robotics, Ltd" line of production and marketing (mainly) or maybe future after sales service support.

Finally, it is indeed acknowledged the level of technical difficulties and impedes that will be pop up in the way. Also, it can be easily understood the amount of time that has to be spent from one human being to produce this kind of innovative product like a "robot" trading the news announcements and thus predicting the market's reactions by itself using the NLP concept. As mentioned above, also a search for "ready to use" add-ons or maybe totally different NLP third-party software applications is needed because many of them could be a "turn-key" solution for the company's production line prerequisites and targets.

Robotics

Even if in the market of algorithmic trading automation, the demand side has identified (maybe from the very start of their appearance several years ago) a robotic nature in these software products and even if the supply side has a marketing interest in this fact, we need to clarify at this point, that these applications are not robotic structures as formal technology and academia defines a robot. However, because "Saint Thaddeus Robotics, Ltd" is focused to retail and small scale institutional traders as its target group, the human CEO of the company will not abolish this common believe in favor of being academically correct[24].

Let us now take a look of how robotics (**and not** robotic process automation aka RPA's), may affect "Saint Thaddeus Robotics, Ltd[25]" main organizational processes:

- **Work Processes:**

<u>Production - design, and implementation:</u>

In the current state of the company, its machines are its robots26, hence since the aforementioned human handler will be the only

[24] After all, "business is business" and sometimes is not so prudent to follow such strict and rigorous scientific definitions. In addition, the word "robot" has been proven as a Marvin Minsky's "suitcase" word, hence we can exploit this.

[25] I'll be keeping the initial name of the company for coherency reasons. I need to underline here that in our industry (software development of algorithmic trading solutions), the word "Robot" belongs to the jargon of the demand side of the market. Our existing and potential clientele have - not only- accepted this word, but it seems that it affects their purchasing tastes positively. As a reference:
https://www.mql5.com/en/market/mt4/expert

[26] and I can define them as such, because through their physical *sensors* (keyboards-mouse and the hardware which allows them to be on the world wide web), their "mind" (CPU hardware, RAM and all internal/external memory enhanced by millions of coding lines in a form of OS software, and different forms *of AI* software) and their *actuators* (screens-sound hardware) are interacting with the only entity possessing human capital (me), in a day to day basis for many years now.

employee[27] of the company who possesses human capital when it goes "live" in the markets competing for a share. These robots will be the company's tangible assets, producing, checking and supporting the company's line of end products[28]. However, to the question about how would it is possible to incorporate a 100% autonomous robot to help the company's current production processes, there's no practical answer to the moment we discuss the above. If and until "Saint Thaddeus Robotics Ltd," grows in such a large scale that it will employ a small army of people occupying several hundreds of square meters as a working space, of course, and 100% autonomous robots would be considered for augmenting production processes[29].

1. New products with robotic characteristics: On the contrary, there's a lot of room for ideas about new end products with robotic features. Retail traders as human beings have the tendency to personalize their successes and failures. They need for someone to glory or blame for those. Apart of the psychological aspects reasoning of their existence, these products would really help the retail trader (or an even smaller scale institutional trader who has to be many hours isolated to a limited physical place); to push up the level of their performance by making him feel that he has an artificial partner in his trading voyage. For example, we can imagine the following dialogue taking place between a human user and a robotic featured product:

-Human: "Hello Ernest. How do you see the markets today"?

-Ernest (Robot): "Good Morning, Boss. Let me tell you about the headlines and some news I think you need to have your attention to Today we will have the NFP release, and much volatility is expected, but of course, you know that. Anyway, FX Street's articles favorites a US dollar upside momentum. Also, the news coming from the EU can be summarized as polarized uncertainty for EU's political and economic stability. Germany's IFO indicator didn't catch up with the expectations. Now, technically speaking the Eurodollar's 4 hours chart is still under its 200 SMA while price failed to surpass it in its yesterday's attempt causing the momentum indicators to have a downward projection.

-Human: "Would you short the Euro, Ernie"?

-Ernest: "Judging from 103 similar cases in the past 4 years, I would if I was in your place, Boss".

-Human: "Why are you smiling Ernie?"

-Ernest: "Because I can smell profits, Boss. Allow me to say, that I can see 89% probability of success for shorting the market now, Boss".

- **Behavioral Processes:**

  2. Decision Making: While the author has been exposed in AI and its applications for markets prediction since almost two decades, recently he came up with the thought that he can exploit its recent developments combined with personal experience and knowledge to incorporate a company which will sell such "robotic" solutions. Therefore, he'd be a liar if at this moment he would have claimed a behavioral indifference to all these kind of innovation. Hence, from now and through the ongoing time AI and robotics evolution will be having an indispensable value for any decisions making process. At this point a constant try of the company to follow and maybe engage with the R&D developments in robotics, as one of the company's fundamental behavioral processes, is strongly suggested. The CEO of "Saint Thaddeus Robotics, Ltd", should also try to convey this realistic approach to any other human employee of it.

  3. Communication Processes- After Sales Service and Support: To market and support its products, "Saint Thaddeus Robotics Ltd" will **not** deploy (as of the time being) a physical robot to deal with its clientele basis. And this choice is coming from two roads: first it will be prohibetely costly to assign to a third party the creation of a pgysical robot and second the potential clientele of the company it may be thirsty for modern tech applications, but it can't handle too much of them being involved with their personal commercial interactions. Also "Saint Thaddeus Robotics Ltd" targeted audience, is focused on users who haven't been exposed to such kind of automation. And this is exactly its niche[30].

- **Change Processes:**

Transformation and Growth: "Robotics" is the last word of the name of this start-up company and it will remain as is, even if for the academia or some robot-cists this might seem not "scientifically correct." This is because in our industry all the RPA's are considered and marketed as "robotic entities," and swimming" against this flow[31] is not commercially advised. But, while the belief of the importance of exploiting the current and future developments in AI (especially via ML and NLP) is stressed more than enough in the previous parts of this "strategic map", we can't say the same about robotics, judging business reality from a **short-term** point of view.

To not be misunderstood: it is so **scientifically** rewarding and also so entertaining to see all these creations to serve human needs in medicine, transportation, hospitality services, and lines of production. But even the best shoe doesn't fit every foot. The reasoning

[27], It may be 16 years old(!), but it is still used as a reference: http://www.mhlnews.com/technology-amp-automation/robots-or-people-balance-costs

[28] The "how's" of this have been given in my previous assignments for this course.

[29] The market -which ultimately dictates the functioning way of "Saint Thaddeus Robotics Ltd", - until now and according to my opinion, doesn't have any competitive fringe applications. Of course from the side of NLP solutions in every hour that it passes, new products-solutions are getting released. Thus, *if and when a physical robot* with such abilities as, e.g., instant implementation of coding using NLP software applications, testing, concluding and report the results, and generally have the ability to interact with the user as efficient as the current stationary robots do, "Saint Thaddeus Robotics Ltd", will have an important increase of its operating monetary capital in order to purchase such a machine. Using market's linguistics, I will have to raise money for that cause.

[30] If I was a car salesman, I'd say: "I sell new age luxurious cars to an old breed of luxurious people. They don't need to know what's under the hood apart of the details which could make them brag to their surroundings. At the end of the day, they can pay an army of mechanical engineers if they ever want to find out".

[31] About 21 years ago, in the first lesson of a class in Wharton Business School, the lecturer wrote just three words on the board: "SALES. SALES, SALES".

behind this stems from viewing things from an angle of strict business necessity, physical robots can't be of immediate use either for the company's internal needs or as company's end products. There are many ideas for the inclusion of Robots in the company's products line and some for an analogous implementation in the set of production processes. Yet-especially for the latter- even if on a personal level any enterpreneur possess the adequate capital resources for that, the model of choices that they are available for a "low risk-high reward" start-up company is limited concerning the induction of physical robotics in its current business state.

Because *change* is happening during the present, but it will *always be verified* within the future, we can assume that robotics is and will be changing the human owner and his "Saint Thaddeus Robotics Ltd," even if currently there is no financial room in the company for it. After all, "*Intangible* Robotics"[32] is the basis of his products creation and as it was mentioned above, it will be the marketed "nature" of them when they will be introduced to their focused demand side of the trading community.

3 Plan of Action And Criteria for success

We always need to have in mind that "Saint Thaddeus Robotics Ltd", is a legal entity and the author's choice to play the role of an experimental start-up company in the industry of financial services, in order to try *merging* new mainstream technology such as AI with its different forms, and business oriented managerial strategies. In other words, this fictional company which is created for the needs of the current paper, is an innovative business project based in new and established knowledge combined with human experience, produced by the author's 20 years as a very active market participant (either as an investor, an analyst and a money manager).

Proceeding further, in the above context which has been created from the previously examined impact and way of synergy of the four AI technologies with the business goals of this start-up company, the proposed initiatives can be summarized as follows:

a) A business "solitaire" model is adopted, a model for maximizing collective intelligence through the partnership of "a one machine to one man" and thus any possible decrease in the number of the degrees of freedom of this model for the sake of its operating and predictive robustness through time, is avoided. The "Keep It Simple, Stupid" (aka KISS) approach, even if the related suggestions (proposed initiatives) were very technologically intense, was followed. Moreover, it is assumed that the human handler – entrepreneur will be the only company's principal. In this way, we have tried to keep far any idea about raising working capital in the present time avoiding any debt or personal equity shares' loss.

b) By keeping initial monetary costs very low and aiming to introduce a "low risk-high reward" model for this new company, and by incorporating in its organizational processes the outcomes of this interaction between an "AI agent to one HI agent", it can be theorized that the implementation of this business model is more realistic than fictional[33]. Specifically, the author suggested several ML, GNL and RPA applications into the *work processes* (design, production, quality checking), into the *behavioral processes* (marketing, support and after sales service) and into the *change and growth process*es (managerial evolution and potential investments) of "Saint Thaddeus Robotics Ltd".

c) With the maximum -possible- care, the author also dealt with Porter's three generic strategies for businesses (taking also in mind Porter's framework) and used it as a distillery in order to present the impact of such technologies and simultaneously to justify the advised business strategic choices. It is then concluded, that "differentiation" and "focus" should be the main market penetrating strategies, while in the last section of proposed AI technologies, the possible deployment of physical robotic entities as production inputs and even more as production outputs, were considered.

Having said all the above, we can *conclude* to the following statement:

In a profit oriented (and maximization) legal entity, the main concern of its shareholders, its BoD and its CEO, should be to serve only the company's interests and not to try to give answers to any other social related and produced dilemmas. We vote for people to take governmental seats and we agree to pay taxes for their social policy. This is why we call them "public" sector. And this is why they call us "private" sector. For example if an AI working agent will be shown more efficient than an HI working agent, the job of a manager is to recalibrate the company's workforce taking in mind everything that comes out his monitoring data. Maybe this sounds very harsh especially to the ears of a sociologist or a leftwing politician, but in the world of businesses "it is what it is[34]".

Returning now, to the case of "Saint Thaddeus Robotics, Ltd", apparently its human owner will not have to be concern about firing people or introducing new jobs or train new employees (for the time being). In addition, his role as the CEO and the only human employee -while it sounds contradictory- it will help him to avoid many other troubles which such new start-ups may face in any industry[35].

This constant effort to harness technology so to make the life of other people better, is adding a lot of value to the company and to its owner's status inside and outside of it. It is believed that he will evolve *together* with his AI agents, to a better creator, coder, tester, critic, marketer, manager, trader and ultimately entrepreneur.

To cope with the technical aspects of implementation of this strategic "road map", a big spectrum of knowledge is needed in the fields of programming, testing, verifying and of course on discovery inclined abilities of each human employee.

[32] Allow me to introduce this term for this assignment's needs. As for reference: https://science.howstuffworks.com/robot.htm

[33] Unfortunately there's a trade-off here: even if I kept the business simple so to be realistically possible to have birth, I reduced the generality of my business model, simply because it is very rare to find such quantity of market experience combined with a very broad spectrum of technical and theoretical knowledge in many different sciences. I have this because I've spend almost all my life reading and half of my life trading, but how many people have done that who are also keen to begin something new? From the other hand, technology evolution produces such kind of singularities.

[34] This approach magnifies the need for a social oriented government which -not only theoretically but also practically- will protect society from these unavoidable causes of unemployment.

[35] Tunneling is one of the most common problems.

Knowledge of economics and financial principles, knowledge of applied statistics and some calculus of multivariate functions are very welcomed. Other vital prerequisites are managerial knowledge, marketing knowledge, general knowledge (which should constantly be evolved) about the markets micro and macrostructure and their behavior and the level of competition are of a deep need so the implementation of all these technical and businesses stuff to be realistic.

But the company doesn't need only experienced and broadly educated scientists; it also needs an educated audience. And because this could be a serious impediment to the company's market penetration, one of the main technical considerations will be the user-friendliness of the end product. This could be achieved not only with a great "help guide" or a complete "user's manual", but should be gained through the UI of the product itself. Clients who pay for a "turnkey" solution, don't want to read up a lot, and especially doesn't want to get frustrated. Again, the human's agent personal experience of being a user before he has been the creator of such applications will be of a great help confronting the above-mentioned challenges.

At this point, the author feels that he has to underline the following: Any business endeavor in such a competitive and also highly technically related field is doomed to fail if its initiators won't have their eyes constantly open and their minds constantly flexible.

To answer the risen question of how all these activities should be distributed as tasks to the working force of the company, first of all, we need to digest that "Saint Thaddeus Robotics, Ltd" creation would never be possible without the synergy between a human and a machine. By extensively working out the terms of this "marriage" we've tried to present a sustainable equilibrium between the human CEO and his machines serving the company's interests. Organizational processes ranging from discovery, designing, testing, validating, quality checking, coding, packing and finally marketing and distributing the end line of products of "Saint Thaddeus Robotics Ltd," wouldn't be possible concerning time constraints if a human would do such things alone. Concerning how these tasks will be distributed, we can summarize everything that the author presented about this micro-managerial decision using just an arithmetical paradigm: "80% machine- 20% human".

Applying the well known from labor economics "Principal-Agent" model in its simplest version, we could say now, that the machines agents will create and the human principal will check, plan and support. That will be the distribution of their respective roles, in a nutshell.

Now proceeding about how this man will conduct this entrepreneurial endeavor, it is assumed that business ethics is not a notion that will be not carefully examined and practiced by and through "Saint Thaddeus Robotics Ltd" organizational processes[36]. To be more specific the company will always have as one of its pillars of business conduct the following components:

1. **Production Practices:** The AI end products of "Saint Thaddeus Robotics Ltd," will be created and quality tested, from the company's agents (both human and machine's) with the application of general accepted scientific means. Their "Robot-advisers," while they will handle trading risks as efficiently as possible, the user manual which will accompany them will try to educate the clients not only about how to use such a computational power but most importantly will emphasize what exactly not to do, and what kind of inherent risks algorithmic trading has.
2. **Marketing Policy:** Allow me to "escape" from the formal bonds of writing here: I will never allow the market to take a wrong message because of my products' description. In other words, selling BS is not in my planning book. That means not "fishing for fools" driven promises of making enormous profits in just a few days or a few months, not spamming their emails by over-abusing NLP marketing applications, and generally not presenting my AI agents as the "cure of all illnesses." I want to use AI to profit from my company's ability to create and distribute high-quality automated trading solutions because this is the only way that the company will survive and evolve. This is not only by applying morality to business conduct but also common sense.
3. **HRM, working conditions, environmental issues:** Since "Saint Thaddeus Robotics Ltd", is not meant to be a tangible factory giant which will consume huge amounts of energy, or having humongous AI robotic autonomous workers in its lines of production, whom in their turn may cause a hazardous working environment for the human workers, I don't think I need to be concerned for all these. From a social perspective, "Saint Thaddeus Robotics Ltd" won't impact families' living standards by firing human workers or by abusing them. "Saint Thaddeus Robotics Ltd" is a "special" company focusing on a "special" audience. Namely AI deployment in its maxima.
4. **Legal Matters:** "Saint Thaddeus Robotics Ltd" will always follow the directives of the regulative authorities, and because its targeted market is literally the whole plant from a demographic point of view, it is obliged to follow a multi-nation made off regulating frame. To be honest, I firmly believe that the main cost of "Saint Thaddeus Robotics Ltd" which hasn't to do anything with its organizational processes, will be

[36] *https://en.wikipedia.org/wiki/Business_ethics*; I believe that the context of this e-page has an immense power as a reference of what I am talking about here.

the purchase of legal services. And because people who try to evolve "bucket shops" in this industry so to make some "quick and easy money" are just fooling themselves by mortgaging their own future, the regulators will use AI and will learn AI applications, so they will eventually strongly regulate the industry. AI based creations in the financial industry, coming even from tiny start-up companies like "Saint Thaddeus Robotics Ltd", can affect very negatively some parts of human society, and the regulatory authorities knows that very well... Therefore, "Saint Thaddeus Robotics Ltd" will always operate by the law, not again only because of moral components of business ethics but because of applying common sense in the way of doing business.

Road Map's timeline of implementation:

Assuming *that all the prerequisite technological and human resources infrastructure already exists* in the current state of "Saint Thaddeus Robotics, Ltd", then the forecasted time frame needed for the company to adopt the proposed "road map" and go "live" being ready to release at least one qualified product, is about six months from this day. As it has been mentioned above, the response from the demand side of the market should be clear after two business quarters from this release.

4 Conclusion

Human history teaches us that every kind of innovation and fundamental discovery which can be applied in production and consumption (the driving forces of supply and demand) and can have tangible effects on them has broad fundamental changes to a society's structure and most of the times for the good of it. From the time of the wheel's invention, or of weapons made of iron instead of copper, or the Athenian's discovery of *democracy*, the invention of money with no intrinsic value, Copernicus' planetary system, Adam Smith's fatherhood of the economics as a theoretical science, the industrial revolution of the 19th century, Einstein's $E = mc^2$ which ultimately led to the nuclear science and its applications in energy production and the creation of mass catastrophic weapons, the discovery of modern computers, and finally the invention of Internet and the creation of the World Wide Web, *humanity has dealt with all its creations*. Sometimes this has led to the good of society[37] and simultaneously sometimes not.

But what it really matters here, is that all the above mentioned disruptive technologies which where *new* for the time they have been presented to the world, some of them seem very trivial and even funny, in the *now,* and only very few of us actually remember their initial impact in society and its analogous reactions. In the context of this, because the discovery of AI and Robotics is not an innovation by itself, like for example the invention of the internal combustion machine, or the telephone and TV, or the discovery of making beer, **but** AI's products **are** *extremely* innovative and useful by all means, the moral hazards which they follow them is not easy to cope with, simply because we have this rapid and constant *change*. In nowadays if we examine the AI technology applications in the way of doing business, society[38] has little time to adapt to something new, because in a few months this "new" is now old and something *newer* replaced it.

Having in mind all the above said, the author firmly believes that the hypothesized human handler and this fictional "Saint Thaddeus Robotics, Ltd", will form a moral driven collective intelligence, by this above extensively described "road map" to use AI and all of its branches and "kids" for the good of his family *through* his honest tries *of making good* to a tiny part of society.

Acknowledgments

The author wish to thank: the head learning facilitator of **MIT**, **Mr. Brian Charles,** the learning facilitator **Mr. Richard Ball** (*especially to him* because of his patience dealing with my assignments and his very creative comments on them) and of course the teaching facilitator Mrs. Bethany LaPenta.

Special thanks to our faculty directors (MIT Sloan) **Professor Thomas Malone**, who was so analytic but simultaneously with his teaching made very complex things to seem very simple, and (MIT CSAIL) **Professor Daniela Rus** for her overall comprehensive wordiness for her human approach to such a difficult topic. Of course many thanks to **Professor Patrick Winston** who with his intensive and dense narrative lead us to the road of what exactly are AI and its past, present, and future. Last but not least, I have to thank **Professor Andrew Lo**, who I, personally, admire because of his work in the field of modern quantitative Finance, the area which I try to serve for the last two decades.

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