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Artificial intelligence negotiation algorithms: Pioneering artificial intelligence negotiation algorithms for business

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ABSTRACT

Objective: The article aims to demonstrate AI's role in supporting negotiation preparations, especially in defending the starting position.

Research Design & Methods: In the article, we applied a descriptive analysis, with a prior review of literature sources, comparison, and deduction. We based the development of the artificial intelligence negotiation algorithms (AINA) on a heuristic-synthetic method.

Findings: We propose an algorithm for defending the starting position that not only structures the negotiation process but also provides practical semantic tools to effectively defend the offer and build long-term relationships with customers.

Implications & Recommendations: The AINA algorithm not only offers an effective tool for present negotiators but also provides the foundation for further identification and development of advanced negotiation algorithms. The considerations presented aimed at providing business practitioners with insights into the integration of AI into negotiation strategies and starting a dialogue on the unification of such algorithms in future AI models that will be capable of conducting complex negotiations.

Contribution & Value Added: The presented algorithm for defending the starting negotiation position, which combines the F-A-B technique (Feature-Advantage-Benefit) with the straight line persuasion (SLP) model, represents a novel conceptualisation of defensive logic in negotiations. It focuses on resisting premature concessions while maintaining constructive dialogue. This synthesis constitutes a significant added value and an attempt to address an existing research gap.

Article type:	research article
Keywords:	negotiation process; artificial intelligence; negotiation algorithms; AI-driven business models; AINA
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INTRODUCTION

Artificial intelligence (AI) is emerging as the most disruptive technology of the twenty-first century, very likely to affect the functioning of individuals, societies, and the global economy, including companies of all sizes: from tech giants developing AI tools for business, through large, small and medium-sized corporations and enterprises to which AI offers opportunities to change their business models using AI, to AI-based start-ups (Weber, 2022). In particular, the emergence of ChatGPT has sparked various discussions about the importance of AI, capable of revolutionising the functioning of many areas (Kanbach *et al.,* 2024; Chuma *et al.,* 2023; Haefner *et al.*, 2023). In the economic sphere, observing the success of companies using AI gives rise to the emergence of new business models based on AI to varying degrees, whereas key questions are those about how to use AI to build and change the architecture of an enterprise with a view to creating, delivering, and capturing

value (Fruhwirth *et al.*, 2020; Jorzik *et al*., 2024). The potential of AI in business processes seems to be huge; one may say that it is still poorly discovered, non-systematised, but continuously tested by enterprises. Nevertheless, the vast majority of companies, as many as 80%, indicate that in the near future AI will enable the maintenance and improvement of competitive advantage (Lee *et al*., 2019), and over 70% of managers indicate that AI will create opportunities for innovative business models with great value creation potential (PwC, 2024; Mariani *et al.,* 2023).

At present, the body of studies on the application of AI in business activities is growing, but no scholars have yet comprehensively addressed the use of negotiation algorithms. In this article, we focused on the issue of using the potential of AI in the negotiation process to defend the starting position, part of the business processes of any company. The article aims to demonstrate AI's role in supporting negotiation preparations, especially in defending the starting position. Therefore, the main research question addressed in this article is: How can artificial intelligence support the creation, structuring, and testing of negotiation algorithms focused on defending the starting position in business negotiations? Rather than attempting to cover all AI-based negotiation tools and platforms, the article focuses on a specific, original algorithm (AINA), designed to delay concessions through structured semantic defence, and examines its functionality in simulated negotiation settings. The structure of the article includes a theoretical part, discussing the current state of application of AI in business activities, identifying the role of negotiation algorithms, with particular emphasis on the negotiation preparation phase, as well as indicating the advantages and disadvantages of automation of the negotiation process, and an empirical part, presenting in detail an innovative negotiation – the algorithm for defending the starting position. It is followed by conclusions from the studies conducted.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Artificial intelligence enables computers and machines to simulate human intelligence and problem-solving abilities. Alone or in combination with other technologies such as sensors, geopositioning, robotics, AI can perform tasks that would otherwise require human intelligence or intervention. As a field of computer science, artificial intelligence comprises machine learning, including deep learning, based on the development of algorithms modelled on decision-making processes in the human brain which, through the use of neural networks, can 'learn' from available data and make increasingly accurate classifications or predictions (John *et al.,* 2023; IBM, 2024).

The emergence of artificial intelligence in modern business is a force changing entire industries and creating new paradigms of the operation and competition of enterprises (Lee, 2019). Global business is dynamically discovering the potential of using AI to build effective competitive advantages and to search for new dimensions of efficiency and new opportunities (Bharadiya, 2023). Consequently, a quickly increasing number of enterprises engage AI in business processes in the hope of building an innovative business model leading to business success (Mishra *et al*., 2021; Weber, 2022).

The rapid penetration of digital technologies has contributed significantly to the growth of the global artificial intelligence market over the past few years. Large investments of technology giants, such as Google, Microsoft, IBM, Amazon, Meta and Apple, in R&D on AI are constantly driving technological progress in various industries. The development of AI is also stimulated by the growing demand for new AI solutions from sectors such as the automotive industry, healthcare, banking and finance, manufacturing, food and beverage service activities, logistics and retail. In 2022, the global AI market was worth USD 454.1 billion; in 2023, it was already USD 538.1 billion, up by 18.5%; this is the compound annual growth rate expected in the market for the next ten years (Figure 1). According to forecasts of Precedence Research (2024), in 2032, the value of the AI market will reach USD 2.6 trillion, an almost five-fold increase over the decade of 2023-2032.

Artificial intelligence affects businesses (Bertoni *et al*., 2022), entire ecosystems (Burström *et al.,* 2021), and industries (Marinakis *et al.,* 2021). People use AI in business to implement automation processes (Qvist-Sørensen, 2020). In this process, the key technology is generative AI (Kanbach *et al.,* 2024), learning to generate statistically probable outputs on the basis of raw data when prompted. Generative models encode a simplified representation of training data and draw on it to create a new

work that is similar to but not identical with the original data (John *et al*., 2023). The development of deep learning has resulted in the extension of the downloaded data to images, speech, music, and other complex data types, which in turn has accelerated the use of AI in business and enabled highly accurate and efficient automation in an ever wider range of business-critical cases (Mishra *et al*., 2021). Generative AI is crucial for business because it allows a kind of automation of creativity, offering a variety of applications in all areas of the value chain (Haefner & Gassmann, 2023). Increasingly better neural networks are projected to improve the quality and diversity of generated content, which also directs AI towards more creative collaboration with people rather than replacing them. As predicted by IBM (2024), in the near future, the computing power of such basic generative models will be made available to companies in a hybrid cloud environment.

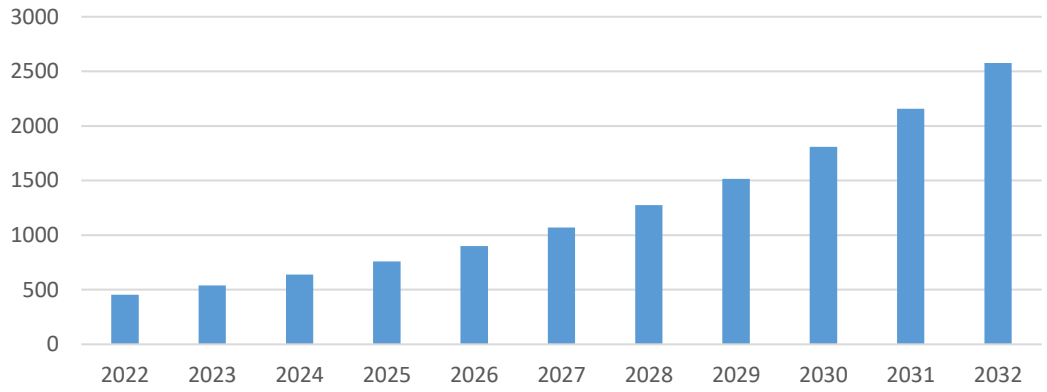

Figure 1. AI market (USD billion)
Source: Precedence Research (2024).

Generative AI aims to transform business models by creating and capturing value in different ways to increase efficiency and reduce costs. Noteworthy, generative AI can serve within existing business models or lead to their adaptation or even radical transformation. The idea is to obtain the effect of innovation from existing business models and create completely new ones (Haefner *et al.,* 2023; Weber, 2022). In the creative industries, AI is accelerating the creation of content for artists and designers. With AI, enterprises create new products and personalised services (Wan *et al.,* 2020). Scholars note that AI allows enterprises to be customer-centric, transforming significantly traditional business strategies (Farayola *et al*., 2023; Nielsen, 2023; Bharadiya, 2023). In e-commerce, AI algorithms personalise product suggestions and even design custom items. Companies can also use AI-generated content for marketing and customer service, saving time, and resources while remaining innovative. Amazon and Meta are best known for integrating AI into advertising their products. This will further accelerate the famous flywheel of platform business models (Haefner *et al.,* 2023; Katsamakas & Pavlov, 2020). Basically, any company can experiment with AI, intending to enhance communication with customers on digital channels, improve customer retention, develop tender offers and manage customer complaints. One area of AI use is the decision-making process based on the analysis of large historical data sets, where AI can optimise the process of making the right and reliable decisions (Battisti *et al.,* 2022; Bharadiya, 2023).

Noteworthy, the use of AI to generate value in an enterprise is a complex, time-consuming, and capital-intensive process which must take place through the systematic implementation of AI tools at every level and every stage of the operation of the business concerned (Fruhwirth *et al*., 2020; Katsamakas *et al*., 2020). The production systems, the interaction of personnel with machines, as well as the interaction of the company with customers, must be completely redesigned, which entails enormous investments but also a huge risk of failure (Rana *et al*., 2022). However, it is essential for successful business process redevelopment and the use of big data for decision-making at the company (John *et al*., 2023; Bharadiya, 2023). Thus, artificial intelligence leads to the emergence of new AI-powered business models (Davenport & Mittal*,* 2022; Widayanti *&* Meria, 2023). To fully exploit the potential of AI in business, it is necessary to gradually implement AI-based solutions, testing their economic utility for a given enterprise and looking for high profitability of the business (Lee 2019). The discourse on AI in business is also taking

place in relation to the need for a kind of balance in the process of integrating AI into the business processes of the enterprise to achieve synergy between the potential of AI and personnel in pursuit of innovative business development, but under the conditions of preserving the ethical practices of AI (Farayola *et al.,* 2023). As noted by Jorzik *et al.* (2024), many studies focus on the technical and organisational challenges associated with the implementation, use, and management of AI. It allows the identification of organisational challenges related to the problem of building an effective business model of the enterprise, thus leading to increased efficiency at the company.

Negotiation is an innate human skill (Martin-Raugh *et al.,* 2019) and an integral part of business life. Most often, the reason for undertaking negotiations in business activity is to establish cooperation with a new counterparty or to continue or improve the effectiveness of cooperation with the current business partner. In general, it is a process of interaction in which at least two parties, who see the need for a common commitment to achieve a goal, but who initially differ in expectations, attempt to overcome their differences by argument and persuasion and to find a mutually satisfactory solution (Fowler, 1996). In relation to business activities, we may define it as a communication process that aims at an agreement between the participants in economic transactions that is satisfactory to each partner when there is a situation of at least partial divergence of interests between the parties (Fisher & Ury, 2011). It is also a process of cooperation rather than a struggle for domination (Prościak, 2024). According to Nierenberg (1987) points out, three elements determine the success of negotiations: (1) the possibility of negotiating in a specific case; (2) agreeing to mutual concessions and compromises; and (3) the trust of the parties. Therefore, a negotiation is a process where the counterparties move away from their initially divergent positions and towards a point where they can reach an agreement (Steele *et al.,* 1995). The negotiation process is undoubtedly complex and complicated (Casse, 1992), it has its dynamics and structure (Fighter, 2007). It consists of several phases, which, in turn, consist of successive specific actions. The concept of negotiation as a process is not only about highlighting its holistic character, but also about drawing attention to its dynamic nature and to the sequence and repetition of specific actions.

The literature describes AI as a tool to support negotiators, especially in the preparation stage of the process. However, the prevailing view is that the negotiation process itself, due to the aforementioned complexity and multifaceted nature, is unlikely to be entrusted to AI. According to some researchers, AI does not replace the negotiator, but it is an effective tool supporting repetitive activities. It allows for properly organising, reading, and drawing practical conclusions in all activities undertaken in the preliminary phase, *i.e.*, the preparation of negotiations (Cummins & Jensen, 2024). Noteworthy, AI performs very well in tasks that have clear rules but complex processes (Liu *et al.,* 2020; Mohammad *et al*., 2019). Thanks to the use of AI, the negotiator can quickly deal with the most laborious, 'mechanical' part of the preparatory phase, thus leaving more time to refine issues that require creative thinking, rational analysis, drawing conclusions and making decisions in fields such as selecting the goal, strategy or negotiation techniques. The analysis of data concerning the negotiation partner allows for choosing more personalised and therefore optimally adapted solutions, thus increasing the chances of success in any negotiation (Fasihullah *et al*., 2023). It also allows one to avoid human error in the form of oversight or failure to identify relevant information, *e.g.*, about the negotiation partner. Moreover, AI can forecast the outcome of talks based on the analysis of previous negotiation processes, which can also result in better preparation for a given negotiation process. Thanks to the right algorithms, AI can compile more data than a human in a given time frame, and it does so with greater precision and accuracy (Schulze-Horn *et al.,* 2020). Thus, broad and predictive data analysis performed in a short period allows one to anticipate potential problems and to focus on higher-value tasks, such as capturing meaningful insights and making informed decisions about optimising negotiation strategies and tactics. Obviously, the quality of the information on the basis of which the analysis is carried out is an undeniable factor; for negotiation algorithms to be effective, it is necessary to ensure the high quality of the data provided and lower costs (Cummins & Jensen, 2024; Agua *et al*., 2024). One should also prioritise security issues, especially in terms of protecting sensitive information about negotiation partners (Fasihullah *et al*., 2023).

We, for one, like a growing group of researchers and practitioners (Schulze-Horn *et al.,* 2020; Eidenmüller, 2025), are convinced that AI can effectively serve as a negotiation tool, and therefore, we

are attempting to create such a tool in the form of AINA, an algorithm for defending a starting position. We decided to verify the following hypotheses:

H1: The use of a structured semantic defence algorithm (combining the F-A-B technique and straight line persuasion model) increases the number of objection-handling iterations before a concession is offered, compared to traditional, unstructured negotiation responses.

H2: The AI (i.a., ChatGPT-4o) models, when supported by a structured negotiation algorithm (AINA), can effectively manage preliminary phases of business negotiations, thus streamlining the initial part of the negotiation process.

Based on the above considerations, we conducted an empirical study verifying the above hypothesis in the later stages of the work.

RESEARCH METHODOLOGY

In any negotiation, successfully arguing and defending one's starting position can determine success or failure. In a dynamic and competitive environment, the ability to convince the other party to accept one's arguments, while understanding their needs and objections, is invaluable. In response to those challenges, we developed an algorithm for defending the starting position, combining F-A-B (Feature-Advantage-Benefit) techniques and the straight line persuasion (SLP) model created by Jordan Belfort (2017). This algorithm not only structures the negotiation process, but it also provides practical semantic tools to effectively defend the offer and build long-term relationships with customers.

We developed the AINA algorithm based on a heuristic-synthetic method (Popper, 2014; Rescher, 2019), with the use of a heuristic thought experiment (in the sense defined by Brożek & Jadacki, 2012), in which the authors combined several established negotiation techniques during a real-time negotiation process. The algorithm emerged as a heuristic insight that unified practical tools into a coherent and programmable decision-making path. The algorithmic structure was not derived from existing AI systems but constructed through a process of conceptual synthesis, triggered during simulations. This process aligns with what the philosophy of science recognises as a heuristic thought experiment – a non-formalised but intellectually rigorous method of modelling a potential solution by recombining known elements of practice into a novel, testable structure.

The F-A-B model, also known as the Feature-Advantage-Benefit model, is a technique used in negotiations that helps to effectively argue and defend one's offer using appropriate semantic techniques (Kawszyn & Szaran, 2013). Feature (F) is an objective aspect of the product or service (*e.g.*, technical specifications, method of execution). Advantage (A) shows how the feature translates into customer benefits (*e.g.*, improved quality, efficiency). Benefit (B) highlights the final value for the customer (*e.g.*, higher profits, time savings, greater comfort). In the context of negotiations, the F-A-B model helps defend the starting position by presenting the offer in a way that focuses not only on the features but above all on the specific benefits for the customer. Therefore, the negotiator can maintain a strong position, emphasising how the solution offered meets or exceeds the expectations of the other party. The phase in which the customer raises objections is the step before finalising the transaction or closing the negotiation phase. Efforts must then be made to reach an agreement, instead of falling into an argument with the customer or suggesting that they are wrong. To apply the F-A-B technique, one can conduct preparatory actions in the following two areas:

1. arguments – a table of at least three F-A-B arguments should be prepared,
2. argumentative sentences – argumentative sentences based on five defence techniques should be presented (Table 1).

The straight line persuasion (SLP) is a system based on the concept that the selling process should be as quick and direct as possible, guiding the customer from the moment of first contact to the closing of the transaction along a straight line (Belfort, 2017). In other words, the point is to respond so skilfully to the customer's objections to always 'nudge' them back towards that straight line from opening to closing the deal. According to Belfort, the most important precursor to one's success is their acquired ability to root out and dispose of disempowering beliefs rather than their inborn talent. One of his suggestions

was to defend one's offer at least three times against customer objections before one starts making any concessions. This is important because there is a chance that the next time one tries to defend the price, one will get their consent to the terms and conditions offered without making concessions.

Table 1. Price defence techniques (PDT)

Name of the price defence technique	Semantic structure
Aikido	Block 1. Yes, it is correct, you are right, the price is not the lowest, and that is why… Block 2. … closing the sentence and argumentation using the F-A-B method.
Karate	Block 1. Yes, it is correct, you are right. The value of the investment is not the lowest. However, if you consider the fact that… Block 2. … argumentation using the F-A-B method … Block 3. … it may turn out to be worth investing.
Wrestling	Block 1. You can express such an opinion… | You can say that… | You can have such an opinion and at the same time know that Block 2. … argumentation using the F-A-B method.
Capoeira	Block 1. This is not [an objection raised], but … Block 2. … [the factor to which that we draw the customer's attention] will make | cause … Block 3. … [what the customer wants to achieve from buying the product, F-A-B argument]
Krav Maga	Block 1. One sentence that presents to the customer the consequences of non-acceptance of the offer or the effects of their 'cheap thinking' only. It shows the customer where they end up if the choice of products is solely based on the low price.

Source: own study based on Kawszyn and Szaran (2013).

Combining the F-A-B technique with SLP is a very strategic approach in the negotiation process. It can serve as a tool to effectively build arguments and defend one's position and convince the other party to accept the offer, especially in the case of objections, which perfectly fits into the strategy of repeatedly defending one's position before considering making concessions. For example, when the customer expresses their doubt about the product's price (*e.g.*, a battery-powered device), the seller may use the following argument:

- FEATURE: 'Our product uses the state-of-the-art battery technology.'
- ADVANTAGE: 'It means that the device can work twice as long on a single charge compared to competing products.'
- BENEFIT: 'This saves you not only the time you would have to spend on frequent charging, but also the money to buy additional batteries'.

By effectively presenting the benefits that are crucial to the customer, one can increase the offer's perceived value. It may convince the negotiating partner to accept the offer without the need to grant a concession, even after several rounds of defending the seller's position. With each defence, one can re-engage the negotiation partner, asking about additional concerns or needs, which offers the opportunity to further adjust the sales arguments from the F-A-B model to their specific requirements. In practice, using those techniques in combination allows one not only to effectively defend the price but also to build long-term relationships with customers by showing how deeply their needs are understood and how the offer can bring them concrete value.

RESULTS AND DISCUSSION

The combination of the F-A-B technique with the SLP sales model can be structured in the form of a negotiation algorithm. Figure 2 shows a block diagram of the artificial intelligence negotiation algorithms (AINA), considering the defence of the positions using the F-A-B and price defence techniques (PDT). In bold, we present the SLP model or the path the customer follows. It is necessary to try to deflect the customer's objections by defending the offer without making concessions until such non-acceptance occurs three times.

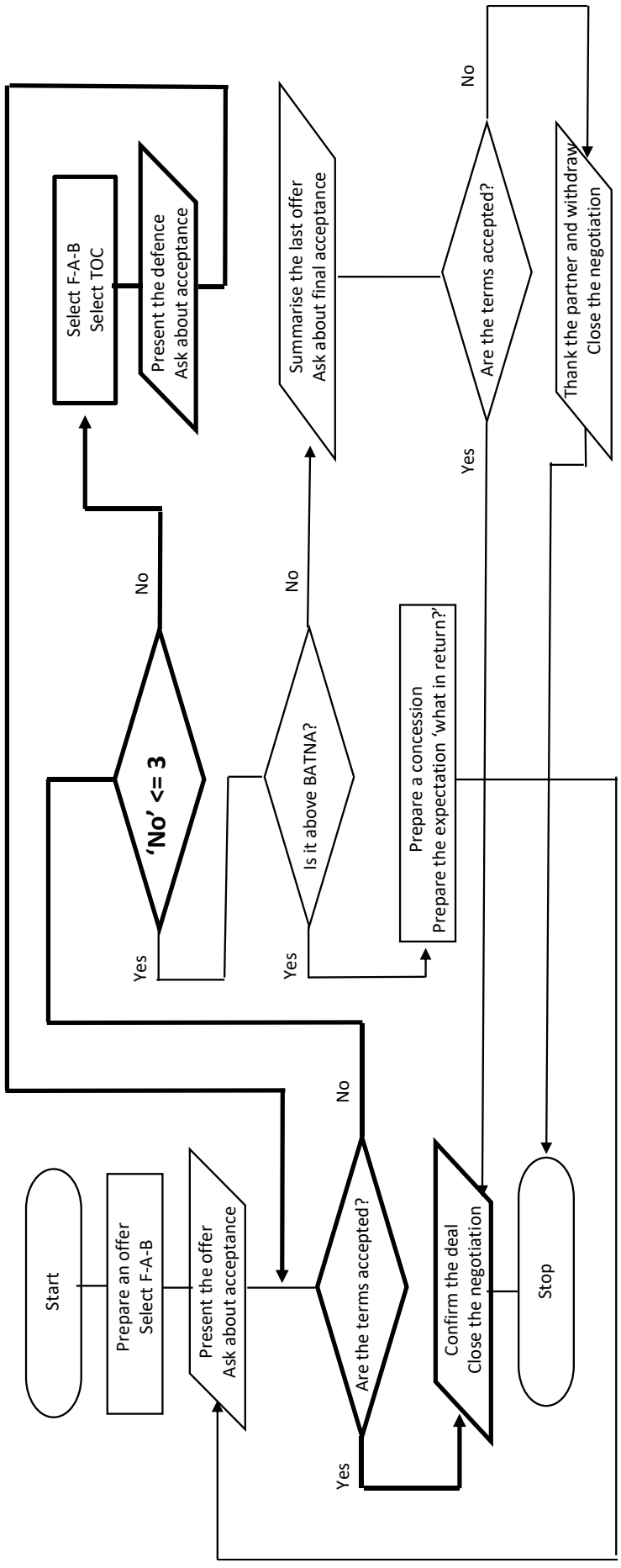

Figure 2. Block diagram of the AINA
Source: own elaboration.

The key condition of the algorithm (Figure 2) is 'no'<= 3. It means that no concession should be offered until after the third objection. It is not arbitrary. According to practitioners such as Belfort (2017), a negotiator should attempt to defend their position at least three times before offering any concession. Semantic price defence techniques also support this principle (Kawszyn & Szaran, 2013), which are structured around waves of objection handling to maximise the perceived value and avoid premature discounting. In the presented algorithm, this threshold has proven to be a psychological 'pivot point.' After three objections, the counterpart is either convinced or begins to expect movement. Therefore, the value '3' reflects a tested and optimised balance between assertiveness and relationship management.

One of the general principles of negotiating to be kept in mind is that concessions should always be offered on condition of the other party's making a concession. Thus defined algorithm allows for the repeated use of the position defence mechanism and iterative proposals of concessions as long as either an agreement is reached on the terms assumed (above BATNA) or one decides to withdraw from the negotiation due to going beyond the area of negotiation. We conducted ten tests of the algorithm presented in this article in the ChatGPT4o model, and we present the test results in an online attachment available at AINA Position Defence Algorithm 29082024 testing (2024).

During the testing phase, we implemented the algorithm in 10 structured negotiation simulations using the ChatGPT-4o model. Each scenario involved presenting an offer, receiving an objection (*e.g.*, 'too expensive'), and applying the algorithm's three-tiered objection-handling logic. Key empirical observations:

1. In 8 out of 10 cases, the simulated buyer accepted the offer after the second or third defence round, without needing to receive a price reduction.
2. In two cases, the model escalated to a concession phase after three unsuccessful objection deflections, which reflects the built-in flexibility of the 'No ≤ 3' rule.
3. ChatGPT-4o maintained semantic consistency and logical reasoning within the SLP framework across iterations, demonstrating the algorithm's compatibility with generative AI language models.

These results confirm that the combination of structured defence and persuasive logic is not only implementable in AI models but also effective in delaying concessions while maintaining customer engagement. The findings suggest that such algorithmic support can improve negotiation performance in simulated and potentially real B2B settings. Given this, we confirm that negotiation algorithms can automate most of the routine activities in all phases of the negotiation process, thus streamlining the entire process, but their potential to generate value is, according to us, particularly useful at the initial stage. For example, their use may be helpful in the following preparatory phase activities:

- Analysis of information about the negotiation partner: Collect and continuously update all relevant data about the partner (e.g., legal form, finances, credibility, structure, prior negotiations). In international cases, also study the culture, customs, and local laws. Negotiations are a process of discovery – new information replaces previous assumptions and drives progress (Voss & Raz, 2016);
- Assessment of the negotiation conditions – awareness of the nature of future cooperation (whether a one-off deal or a permanent relationship), time constraints, negotiation costs, as well as the legal, ideological and procedural requirements has a significant impact on further tactical actions;
- Selection of members of the negotiating team – based not only on competence, negotiating skills, or anticipated roles to be fulfilled in the team, but also on the analysis of personality traits, habits, or interests adequate to the competence, skills, and character of the negotiating team of the partner. Effective negotiators are well-prepared, flexible, assertive and able to build relationships based on trust. They use information, control their emotions, seek common benefits and show patience (Prościak, 2024). It is important here to assess one's own as well as the partner's strengths (the possibility of the partner's influence on decision-making, exerting pressure, assessing the strength of arguments, determination, establishing the respective strengths and weaknesses of the parties);

- Analysis of goals and alternatives: Precisely define and prioritise your own goals (hard and soft) for each negotiation issue, setting maximum (ideal) and minimum (resistance) targets. Identify and assess alternative solutions (BATNA). Understand and rank the partner's goals and compare them with your own to guide negotiation strategy (Roszkowska, 2007);
- Defining the Zone of Possible Negotiation Agreement (ZOPA): By comparing both sides' goals, identify zones of agreement, partial conflicts, and concession possibilities. Evaluate short- and long-term benefits, prepare counterarguments, and anticipate the partner's questions to strengthen your negotiation position (Spangler, 2003);
- The choice of negotiation strategy and tactics – in business, the concepts of conducting talks are not universal, which is why a professionally developed strategy provides for many scenarios, whereas carefully selected tactics (a sequence of negotiation techniques) are key to succeed in negotiations. The most effective strategies and techniques are based on well-established knowledge, experience, analytical thinking skills, a flexible approach to a given topic and good relations with the opponent.

The empirically study has demonstrated that:

1. The current AI model is not yet a system advanced enough to allow artificial intelligence to negotiate in such a way that, based on a simple general algorithm, a person should have a sense of contact with a negotiator communicating at the same (human) level;
2. Even today, the AI system allows negotiators to better prepare for real negotiations, thanks to conducting test negotiations using the algorithm.

The algorithm presented above is particularly useful in the negotiation of complex products or services where it is important to accurately explain the value of the offer and to effectively deflect objections. It allows negotiators to maintain a clear path to closing the deal while building a solid foundation for future interactions. Thus described algorithm described includes key elements of defending the starting position in negotiations. However, like any model, it may require adapting to specific situations and customers. One can also supplement it with additional techniques and tools, such as SWOT analysis, BATNA or non-verbal communication techniques. The proposed algorithm for defending the starting position, based on a combination of two techniques, namely the F-A-B technique and straight line persuasion (SLP) selling model, can serve, *inter alia*, in the following business negotiation settings:

1. The product or service requires a detailed explanation of the features, advantages and benefits.
2. The negotiation partner has many objections and questions about the offer.
3. The aim of the talks is to defend the price and to minimise concessions.
4. It is important for the negotiation partner to feel that their needs are understood and fulfilled.
5. Both parties to the negotiation process have clearly defined goals and needs.

Both buyer and seller can deploy thus created negotiation algorithm. From the seller's perspective, the prerequisites for using the algorithm are as follows:

1. For better preparation, especially in terms of knowledge of the features, advantages, and benefits of the offered product or service.
2. For implementing effective and efficient conversations with the customer, building long-term relationships and listening more actively to the customer's needs.
3. For a convincing presentation of the offer. To specify its unique value to the customer thanks to the use of the language of value.
4. To respond effectively to customer objections. Especially because of the 'upfront' expectation of and preparation for the need to respond to objections. Also thanks to the valuable arguments prepared beforehand.
5. To persuade the customer to close the transaction. Faster closing of a sale or of a negotiation stage in a given area.

On the other hand, the deployment of the proposed algorithm should prepare the buyer to decline the presented proposal in several steps, which will encourage the seller to present all the main advantages and benefits of the offer under discussion. Buyers can use similar techniques to obtain better terms for themselves, namely:

1. Offer analysis: by evaluating the features, advantages, and benefits of the offer presented.
2. Expressing objections: formulating questions and objections to obtain additional information or better terms.
3. Negotiating terms: using arguments based on the F-A-B model to obtain better terms or price.

The discussion on the application of AI in negotiation processes is becoming increasingly intensified, particularly in the context of leveraging AI's potential to establish a solid foundation for these processes. Researchers have been focusing on various AI tools that support negotiations, including natural language processing (NLP) tools, which assist in sentiment assessment and the understanding of communicative aspects; predictive analytics tools, which help forecast negotiation outcomes; sentiment analysis tools, which facilitate the evaluation of the emotional state of negotiation partners; as well as data analytics platforms and negotiation support systems, which aid in the development of negotiation strategies. AI-based negotiation models include approaches grounded in game theory (Lewis *et al.,* 2017) and machine learning (Bagga *et al.,* 2020). Many scholars highlight that the core principles of classical human negotiation theory – such as transparency, assertiveness, relationship-building, and the importance of fairness – remain essential in AI-mediated negotiations (Gratch, 2021; Shin *et al*, 2024; Shin, 2022; Vaccaro *et al.,* 2025). Contemporary discussions tend to emphasize either cooperative approaches to negotiation (*e.g.*, win-win models) or predictive models focusing on pricing or behavioral patterns. However, they often lack the provision of a practical, tactical algorithm that would enable a structured and repeatable defense of the initial negotiation position. To the best of the our knowledge, no previous study has integrated semantic tools used in sales under pressure (SLP) with value-based structural argumentation (Features–Advantages–Benefits; F-A-B) into a coherent decision-making pathway designed to defend an initial stance without the need for immediate concessions.

CONCLUSIONS

This article introduced and tested an original negotiation algorithm (AINA) based on a structured combination of F-A-B techniques and the straight line persuasion model. The empirical component, conducted through a series of structured simulations using the ChatGPT-4o model, showed that the algorithm enables consistent objection handling and supports negotiators in maintaining their initial offer without making immediate concessions.

While the results demonstrate the algorithm's compatibility with AI-supported dialogue and its ability to simulate persuasive negotiation behaviour, claims related to deeper outcomes – such as building long-term relationships or improving customer understanding – remain theoretical assumptions, which require further validation in comparative field studies involving human participants and real negotiation processes. We positively verified both hypotheses. Structured semantic defence using the AINA algorithm (H1) might increase the number of objection-handling iterations before concessions are made. Furthermore, when guided by this algorithm (H2), AI systems like ChatGPT-4o demonstrated the capability to manage early negotiation phases effectively, thereby streamlining the preparatory process and enhancing initial offer resilience.

Research limitations include the AI-simulated nature of the tests, the lack of benchmarking against traditional techniques, and the absence of longitudinal relationship metrics. Despite the promising results of the AINA algorithm in simulated negotiation scenarios, we must acknowledge several limitations. Firstly, we optimised the current version of the algorithm primarily for defending the initial position during the objection-handling phase, and its utility across other negotiation phases (*e.g.*, opening, final concession exchange, post-negotiation anchoring) remains untested. Secondly, the algorithm assumes a relatively linear and rational behaviour pattern, which may not fully capture the emotional, cultural, or strategic complexity of real-world negotiations – especially those involving asymmetric power or cross-cultural dynamics. Thirdly, there is a risk that excessive reliance on structured defence routines may limit the negotiator's flexibility or reduce perceived authenticity. From a technical perspective, further work is needed to ensure the adaptability of the algorithm to evolving dialogue in multi-turn interactions and to calibrate its integration with generative AI systems in ways that preserve human agency. Future research should explore how AINA-type algorithms perform in live, high-stakes

B2B negotiations, including field experiments with human participants, comparative studies against alternative AI support methods, and cross-cultural validation of defence logic across negotiation styles. Further research is necessary to evaluate the algorithm's performance in live negotiations, test its cross-cultural effectiveness, and measure its impact on relationship-building over time.

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Use of Artificial Intelligence

The text is free of AI/GAI usage. However, we used the Chat GPT-4o model during the testing phase of our algorithm in 10 structured negotiation simulations.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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