Automated Quote Generation Using AI for Product Configuration, Pricing and External Order Integration in SAP CPQ

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ABSTRACT

Products and Services Configure-Price-Quote (CPQ) systems are used to aid in product configuration, pricing, discounts, preparation of quotations, and downstream orders processing. However, the task of creating quotes becomes even harder when the business has highly configurable products, products with price customization, intricate dependencies, discount business policies, and numerous business systems. Traditional CPQ processing is very dependent on pre-coded configuration rules, price processes and exception processing. The paper presents an AI-powered model of automated generation of SAP CPQ quotes with product setup, smart pricing, quotation verification, automated quote-generation, and external integration of orders. The structure combines enterprise data, SAP CPQ capabilities, contextual analysis powered by AI, rule and policy validation, exceptions detection and links orders via an API into one quote-to-order lifecycle. The AI models analyze the customer requirements, product attributes, the past quotes, the price pattern, the discount information, and the circumstance of a business to propose suitable settings and discover potentially contradictory and non-regular business choices. There is a human agent validation layer that ensures that a commercial exceptional rule is validated prior to completion of the quotation. Configuration accuracy, configuration-conflict detection, pricing consistency, quote-generation time, validation accuracy, manual intervention, exception-detection rate, order-integration success rate and order-processing time are used to evaluate the framework. The analysis shows that the use of AI intelligence throughout the entire quotation lifecycle has the potential to enhance the consistency of decisions, minimize redundantly involving human efforts into the process, and reinforce consistency between the quotation and the order execution. The suggested framework incorporates an AI based framework with a human-monitored approach to the relation between configuration and price generation, quotation, and validation and external order processing in the SAP CPQ environments.

KEYWORDS: SAP CPQ, Artificial Intelligence, Automated Quote Generation, Product Configuration, Intelligent Pricing, External Order Integration.

DOI:10.21590/ijhit.05.02.12

I. INTRODUCTION

The use of configure-price-quote (CPQ) systems have now become an important aspect of enterprise sales activities since they would help address the disconnect between customer needs and sales-specifically viable product specifications, customer prices and official quotes. The environment of CPQ is usually helpful during configurable products and options selection, utilization of pricing logic, creation of a discount, and the production of a quotation and pursuance of accepted quotation to fulfill an order. Even product configuration has traditionally been considered an activity based on knowledge content and where standardized elements and limitations need to be integrated in order to

meet the customer needs without damaging technical and consistency [1], [2]. Recent advances also mention the use of smart and data-driven configuration since the set of potential variants of products and individual customer needs can force the purely manual configuration to be hard to contain [3], [4].

SAP CPQ provides enterprise sales with the option of product configuration, pricing, and quotation. It is also able to be integrated with other business systems and that is why the quotation information can be incorporated in the downstream business processes. One such scenario would be with the SAP document on integration of SAP CPQ and S/4HANA Cloud where a signed CPQ quotation can cause the creation of a solution order in which product and pricing information will be migrated to the back-end system [5]. SAP CPQ has also product and quote related API, which can be interacted in programs with enterprise applications [6]. All these capabilities have provided a substantial technical background of quote-to-order automation.
Enterprise quotation generation Due to these features, generating quotations when products have numerous configurable features and compatibilities is hard. A sale representative may need to query the technicality of the selected combination, the material of it, which is dependent, the requirement of certain features, a reasonable price assigned, a discount with particular set conditions to the customer, commercial policies and finally composing the quotation. It becomes even more complex under the circumstances when all kinds of historical quotes, negotiated prices of individuals, changes in a product, and dynamism in pricing policies must be considered. The use of product configuration has proven that it is possible to minimize errors in specification and quotation lead time, yet creation and maintenance of configuration knowledge does not come easy [2], [7].

The classic CPQ systems are mostly based on the pre-defined rules, constraint modeling and product designs, price processes, and business policy. Such mechanisms are important since configuration and pricing decisions need to align with articulate enterprise constraints. Nevertheless, processing which follows the rules might struggle to leverage information in historical quotes and in the interactions with customers. An example of this is that old quotations might have handy motifs related to commonly used configurations, product formulations based on customers, common levels of discounts or common exception rules. Deterministic rules can be improved by applying data-driven and AI-based approaches to uncover the trends, offer suggestions in the context [3], [8].

The current research indicates that an increasing number of people are interested in smart product setup. Both knowledge-graph and machine-learning methods have been proposed to extract configuration knowledge based on the available product and process data [8] and match customer requirements with custom product configuration [9]. Configuration methods based on deep learning have as well shown the capability to quickly propose customized configurations [10]. It indicates that AI can be applied to complement existing configuration mechanisms, providing recommendation, prediction and anomaly-detection capabilities.

The other important feature of CPQ is its price. Enterprise pricing could be founded on the nature of the product, type of the customer, location, number, contractual conditions, deals and trade policies. SAP CPQ facilitates the process of pricing and matching relating to the background pricing systems, therefore, pricing data could be exchanged between the CPQ and the SAP business systems [11]. Nevertheless, intelligent pricing is not to be understood as uncontrolled algorithmic pricing of individuals. Commercial policies, fair play, and contract theory, margin requirements, and organizational approval policies have to be authoritative. Rather, AI would be used to support an evaluation of the contextual prices and initiate exploiting the identification of discount anomalies, as well as propose where deterministic pricing regulations continue to apply to enforce accepted business terms.

The other complexity of operation is the quotation stage. Having a technically sound construct, but one that contains inconsistencies in pricing and discount boundaries, customer data, required areas and other aspects of policy can still produce an invalid commercial quote. Repeated corrections in a manual form increase the processing time and creates errors that may occur. Once a quotation is approved, the other possible source of data inconsistency may lie in manually operating or typing quotation data into an external order-management or ERP environment. Therefore, quote-to-order process may be considered to be flowing information in contrast to a row of standalone operations.

The past researches have been done on product configuration, intelligent recommendation, configuration verification or pricing, or enterprise integration as comparatively more definite problems. The proposed framework can combine these skills and offer a decision layer that is overseen by human to the commercially significant exceptions.

The objectives of the study are: (1) to design an AI-enabled product configuration and pricing in SAP CPQ; (2) to join AI-based configuration and price setting examination and automated quote creation; (3) to embed automated verification checks and exceptional detection before finalizing a quote; (4) to make an organized system of transferring approved quotation data to external order system; and (5) to examine the framework in configuration, price setting, efficiency, intervention, and integration-related measures.

The rest of the paper is structured in the following way. Section 2 takes related literature on product configuration, intelligent configuration, pricing, quotation automation and enterprise integration. Section 3 shows the proposed AI-aided automated quote producing technology. In Section 4, its evaluation and quantitative results are discussed. Section 5 discusses implications, benefits and limitations. Section 6 draws a conclusion of this paper and specifies the way of further research.

II. RELATED WORK

2.1 Product Configuration and CPQ Systems

The product configuration deals with the selection and combination of existing product components based on customer requirements and technical limitations. Traditional configuration systems tend to rely on the representation of knowledge, constraints, rules, feature models, or logic-based reasoning [1], [11]. These techniques have also been successfully transferred to complex industrial goods because they are capable of explicitly modelling compatibilities and preventing unlawful combinations.

Research has established that product configurations can deliver high operational returns, including superior quality of product specification, reduction of error and quotation-generation time, reduction of routine work, and improved uniformity of customer-specific product specifications [2]. However, configuration systems can also become difficult to code and maintain as product structures, rules, and dependencies expand. The acquisition of knowledge, system scope, documentation, or organizational requirements may not be handled appropriately, which can lead to project failure [7], [12].

CPQ systems expand product configuration capabilities to include pricing and quotation workflows. Selecting a technically viable product is insufficient; the resulting configuration must also be commercially priced and formatted into a formal quotation. Modern configuration frameworks emphasize that CPQ systems seamlessly unify configuration, price calculation, and document generation [4], [13].

SAP CPQ provides an enterprise environment for these operations. Its product and quotation APIs enable programmatically managing product details and quotes [6], while its integration capabilities facilitate communication with backend SAP systems. SAP technical guides elaborate on porting CPQ quotation data directly into SAP S/4HANA to generate sales and service orders automatically [5]. These functionalities demonstrate that CPQ serves as a critical coordination point between sales operations and downstream enterprise processes.

2.2 AI-Based Product Configuration

The domain of artificial intelligence has long been tightly coupled with product configuration, as configuration tasks can be modeled as knowledge-based expert systems. Past research focused heavily on constraint satisfaction, logic-based reasoning, knowledge representations, and expert system methodologies [1], [14]. While these techniques remain foundational, data-driven AI offers new opportunities to learn configuration patterns directly from historical cases.

Data-driven approaches demonstrate that configuration knowledge can be synthesized from historical product variant data to optimize new product variants [8]. Similarly, user preference and cognitive frameworks help identify product design options that satisfy complex, multi-criteria customer specifications [15]. These works reflect a shift from purely static rule bases toward adaptive systems capable of learning from customer requirements and data flows.

More recent architectures utilize deep learning and knowledge graphs. Deep learning frameworks have been successfully applied to recommend configurations with high accuracy in complex industrial environments [10]. Knowledge-graph models have also been introduced to map customer requirements directly to configuration knowledge bases, generating personalized product recommendations [9].

Generative AI further streamlines configuration by enabling natural language interactions. Recent studies demonstrate how large language models and natural language processing interpret unformatted user requirements and convert them into structured constraints verified by deterministic constraint solvers [16]. This highlights a flexible hybrid architecture where AI interprets user intent while deterministic engines enforce validity.

2.3 Intelligent Pricing and Discount Analysis

Enterprise CPQ pricing models incorporate variables such as product attributes, customer tiers, volume quantities, market conditions, contractual terms, and discount structures. Deterministic pricing engines remain ideal for core calculations, as they ensure policy compliance and complete auditability. However, analyzing historical quotation data reveals valuable business trends and contextual patterns over time.

AI enhances pricing workflows through predictive analytics, contextual insights, anomaly detection, and discount recommendations. Rather than replacing authoritative pricing logic, AI adds a contextual intelligence layer that analyzes relationships between customer context, product setups, historical quotes, and discount trends.

This distinction is essential in corporate settings, where unconstrained price customization raises governance and ethical concerns regarding price discrimination [17], [18]. Consequently, AI-generated pricing serves as guidance and must align with established business rules and trade policies, leaving the deterministic pricing engine as the ultimate authority.

2.4 Automated Quote Generation and Validation

Quotation generation requires more than document formatting. It must ensure that internal configurations, customer records, pricing tiers, discounts, taxes, and mandatory fields are completely consistent. Errors at this stage result in costly re-quotes, client friction, and order processing delays.

Studies on configuration systems show that automated quote generation delivers significant gains in speed and accuracy [2], [7]. However, complex product-pricing relationships still require robust validation. Deterministic rules can be augmented with an AI-enabled validation layer to catch non-standard feature combinations and historical pricing anomalies.

For example, a configuration might satisfy every formal business rule yet represent an unusual feature combination rarely selected by a given customer segment. Similarly, a discount might be rule-compliant but deviate sharply from recent similar deals. Identifying these cases as exceptions provides targeted focus for human review without overriding enterprise rules.

2.5 Enterprise Integration and Quote-to-Order Processing

Enterprise CPQ systems function as core components of broader application ecosystems including CRM, ERP, e-commerce, and order management platforms. Key integration data includes product IDs, customer details, quantities, prices, discount structures, and transaction statuses.

SAP integration documentation illustrates quote-to-order processing between SAP S/4HANA and SAP CPQ, where downstream order creation is triggered by the quote acceptance event [5]. Standard mappings align pricing procedures between CPQ and S/4HANA, translating pricing conditions directly into itemized field mappings [11]. These processes emphasize the necessity of precise data mapping and synchronization across platforms.

However, external order integration introduces potential failure points. Mismatched product identifiers, missing mandatory fields, schema incompatibilities, authentication failures, network latency, and out-of-sync status flags can disrupt processing. Consequently, an end-to-end quote-to-order workflow requires robust API connections, continuous validation, explicit exception handling, and transaction monitoring.

2.6 Research Gap

Existing literature reflects significant progress across product configuration, AI-driven configuration recommendations, automated validation, intelligent pricing, and enterprise system integration. However, these domains are largely studied in isolation.

Product configuration research focuses primarily on rule bases, constraint satisfaction, and recommendation algorithms [8]–[10], [15]. Pricing studies concentrate on transaction processing or mathematical price optimization rather than unified enterprise integration. Conversely, platform documentation details technical data exchange but lacks an overarching AI decision framework.

Consequently, a gap exists for a unified framework that seamlessly integrates AI-assisted product design, intelligent pricing analysis, automated quote generation, AI-driven validation, and external order processing—all while preserving deterministic enterprise controls and human oversight. The proposed framework directly addresses this gap.

III. AI-ENABLED AUTOMATED QUOTE GENERATION FRAMEWORK

3.1 Framework Architecture

The proposed framework consists of six interconnected layers:
Enterprise Data → SAP CPQ → AI Intelligence → Quote Generation and Validation → External Order Integration → Monitoring and Governance
The knowledge base of the framework is made up of enterprise data. It holds the product catalogs, product attributes, configuration relationship, customer profile, history of past quotes, prices records, discounting data, order records and business applicable policies.

The large quotation environment is SAP CPQ. The CPQ process captures customer demands, product choice besides configuration and pricing rules afford business acumen that has been displayed to be deterministic.

The AI Intelligence layer is implemented to work in collaboration with SAP CPQ and not to displace the fundamental enterprise controls. It analyzes customer requirement, historical quote trends, correlation of products and price data together with the environment in which the transactions are taking place. The suggestions, price indications, anomaly signals, and exceptions scorecards under this company are also set up.

The Quote Generation and Validation layer refers to a two-fold task of paying attention to deterministic policy checks and exception analysis through AI. Configuration, pricing and discount and mandatory-data criteria can be automated using two quotations to meet those criteria. There are exceptional cases which are sent to be reviewed by individuals.

External order integration layer transforms information of approved quotation into format needed by the target ERP, order-management or enterprise system. According to SAP documentation, SAP CPQ can be a part of automated solution-order creation with SAP S/4HANA Cloud and that the quotation product and pricing information could be transferred to the backend [5].

Auditability, monitoring and governance are supported by the last layer. It logs AI recommendations, results of validation, human overrides, integration responses, and transaction status.

The proposed AI-enabled SAP CPQ architecture illustrated in Fig. 1 is an interconnection between enterprise data and CPQ processing, AI intelligence, quotation validation, external order integration, and monitoring. Figure 1 presents the proposed AI-enabled SAP CPQ architecture connecting enterprise data, CPQ processing, AI intelligence, quotation validation, external order integration, and monitoring.

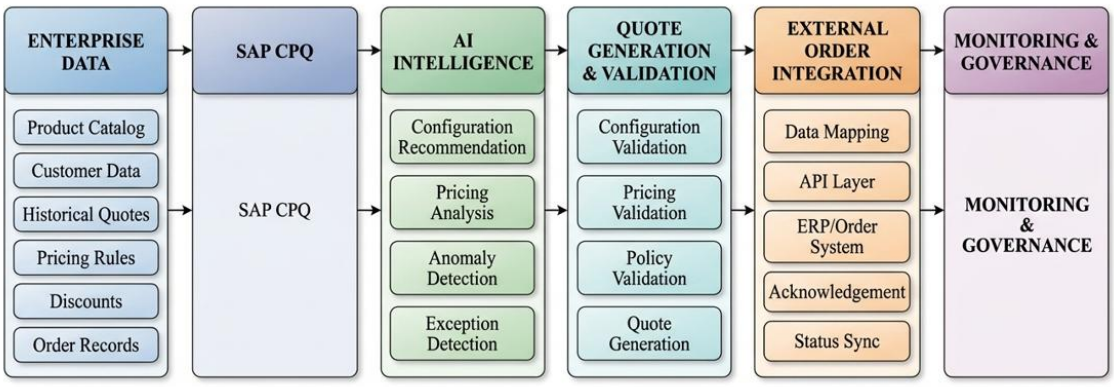


Figure 1: AI-enabled SAP CPQ architecture for automated quote-to-order processing

3.2 AI-Based Product Configuration and Pricing

Requirements of the customer are obtained and configuration begins. The requirements may be expressed either as structured properties, or in natural language. These requirements are converted to an AI layer to match into a structured representation explaining the required product properties, quantities, limitations, and preferences by customers.

A configuration recommendation can be represented conceptually as:

$$C^* = \arg\max_{C \in \mathcal{C}} S(C|R, K, H)$$

where C* represents the recommended configuration, R represents customer requirements, K represents product and configuration knowledge, H represents historical quotation information, and S represents the suitability score.

The structure is not authorised by the AI suggestion by itself. Deterministic configuration checking is presented to the proposed configuration. Rules of compatibility, properties needed, dependency and availability of products are still enforced.

This hybrid solution mitigates one of the main shortcomings of completely data-driven configuration. The fact that a technical constraint is violated should not be simply considered as a statistically more frequent arrangement. A deterministic configurator, however, may result in multiple correct configurations, but cannot give an indication which is best suited to fulfill the outlined requirements of the customer.

Pricing intelligence follows a similar principle. The framework analyzes customer characteristics, selected configuration, quantity, historical quotation information, discount patterns, and applicable pricing policies. A conceptual pricing-support score can be represented as:

$$P_s = f(C, U, Q, H, D, R_p)$$

where C represents configuration, U represents customer context, Q represents quantity, H represents historical quotation information, D represents discount information, and Rp represents approved pricing rules.

The output can be a recommended price range, anticipated discount range or anomaly indicator as opposed to an unrestricted price. The ultimate price of the commercial is decided with the help of approved pricing procedures.

This difference, in particular, between the AI suggestion and the pricing, which can be considered authoritative by law, is particularly essential as the personalized pricing can trigger the problem of equity, transparency, and control [17], [18]. Figure 2 presents the AI-based configuration and pricing workflow from customer requirements through configuration validation, pricing analysis, and discount assessment.

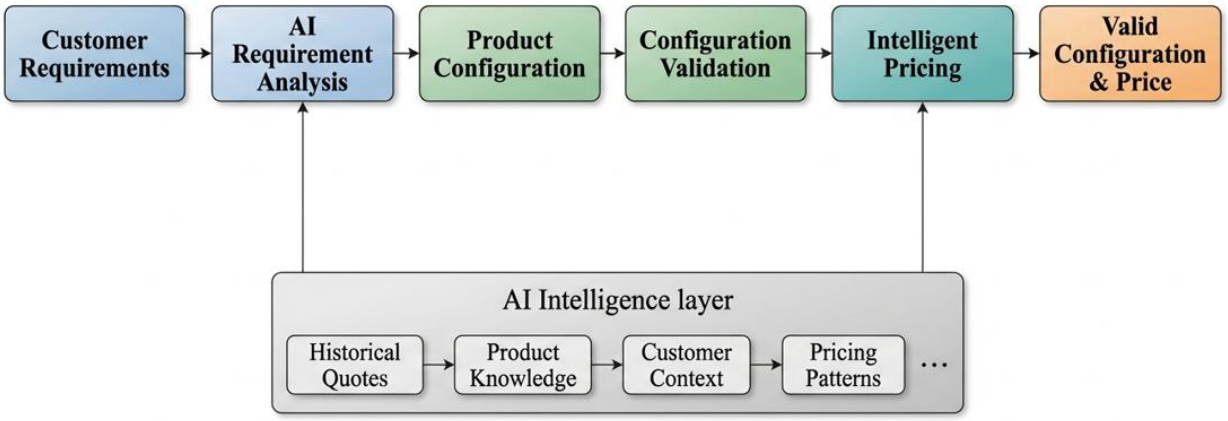


Figure 2- AI-based product configuration and pricing workflow

3.3 Automated Quote Generation and Validation

After being configured and priced in the framework generates a structured quote with customer information, product information, the configuration of the product selected, quantities, prices and any other mandatory commercial information.

The validation process is organized into four major dimensions:

1. **Configuration validation**
2. **Pricing validation**
3. **Discount and policy validation**
4. **Exception and risk detection**

Configuration validation is the mechanism that makes sure that the given components and attributes are compatible and dependent upon each other. Similarity in pricing of the products, quantities, pricing and values calculated. Discount validation assures that discounts given and compliance with authorized policies and approval limits.

The AI-based exception layer then analyzes the completed quotation for unusual patterns. An exception score may be conceptualized as:

$$E = w_1 C_f + w_2 P_a + w_3 D_a + w_4 H_d + w_5 I_r$$

where Cf represents configuration-failure indicators, Pa represents pricing anomalies, Da represents discount anomalies, Hd represents deviation from historical patterns, and Ir represents integration-related risk.

Quotations that have low exception scores can be automatic processed. High scoring quotations are sent to a relevant human reviewer.

This architecture draws on human-in-the-loop model as opposed to attempting to make fully autonomous business decisions. This is viewed as an attempt at automating the routine cases but concentrating human effort on the unfocused, strange or sensitive to business transactions. Figure 3 presents the AI-based quote validation and exception-detection framework, showing configuration validation, pricing validation, discount and policy validation, exception detection, and human review.

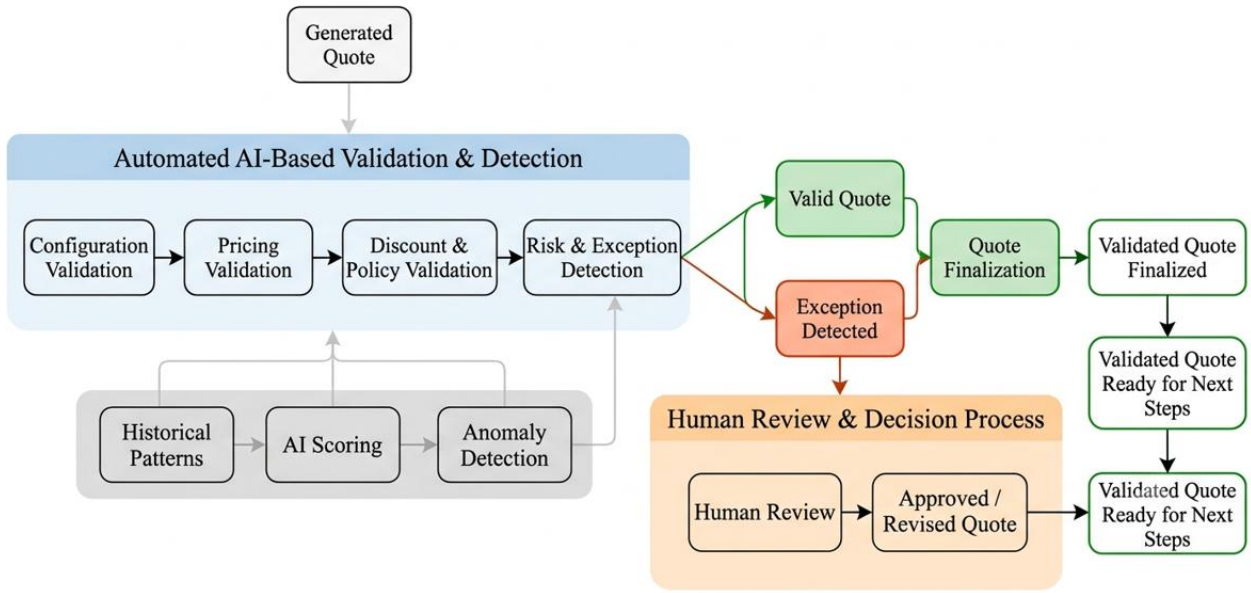


Figure 3- AI-based quote validation and exception detection framework

3.4 External Order Integration

After a quotation has been accepted, an order-ready representation is prepared by the framework. The transformation provides the customer identifiers, product identifiers, configuration details, quantities, prices, discounts, currencies, the details about deliveries, and other mandatory details required by the destination system.

The significance of the transformation layer is that the internal representation may be non-similar to the information format of an ERP or external order-management system which is contained in a CPQ quotation.

The integration process can be represented as:

$$Q_{approved} \rightarrow M(Q) \rightarrow API \rightarrow O_{external}$$

Qapproved is the approved quotation, M (Q) data transformation and mapping, API, and Oexternal is the integration interface and external order transaction respectively.

The example of API-based product and quotation interaction and integration with SAP S/4HANA Cloud to generate downstream solution-order (downstream) [5], [6] can be found in SAP CPQ documentation. SAP also captures the mapping of pricing-procedure to the S/4HANA Cloud since it observes how it maintains consistency between the pricing data in the quotation and the transaction in the background [11].

The proposed model, therefore, includes five integration stages preparation of data, field mapping, API transmission, acknowledgement processing and status synchronization.

When the successful processing is confirmed by the external system, its status is updated in CPQ environment. When there is a failure in transmission, the transaction has to be put into exception state and the cause of failure noted. This gets rid of any silent failures and provides a traceability between the quotation and downstream order. Figure 4 presents the external order integration and data-

synchronization framework connecting an approved SAP CPQ quotation with data transformation, API communication, external order processing, acknowledgement, and status synchronization**.**

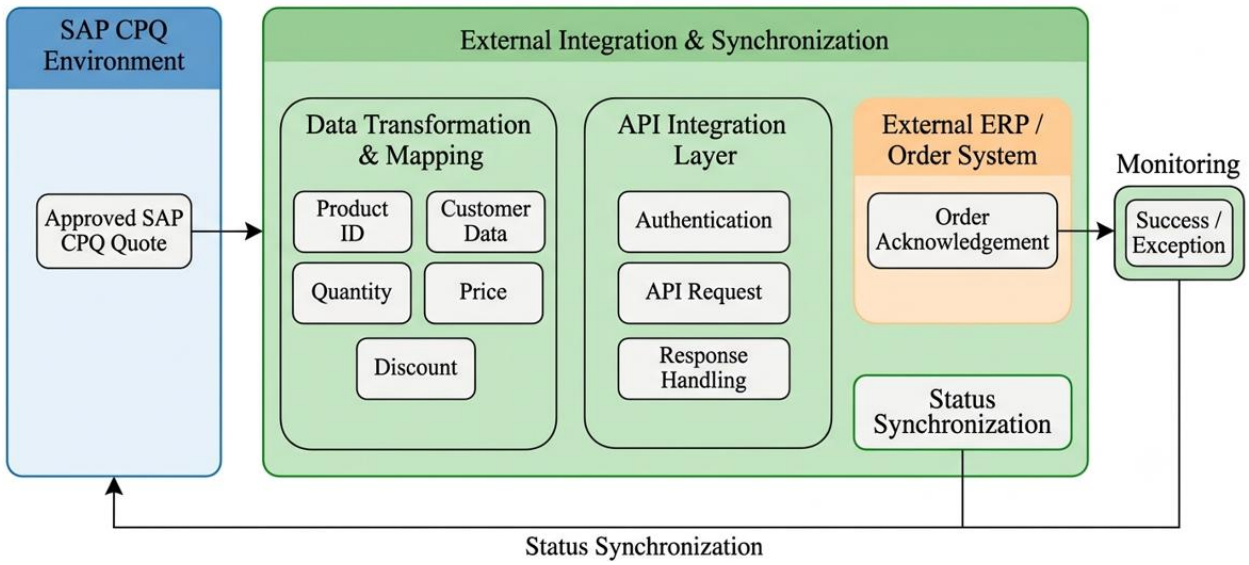


Figure 4- External order integration and data synchronization framework

3.5 Governance and Human Supervision

IV. FRAMEWORK EVALUATION

4.1 Evaluation Scenarios and Metrics

The framework is put through simple and complex enterprise transactions in a normal quotation situations. The situations are regular product configurations, complicated configurations with multiple dependencies, configuration conflicts, customer-pricing, huge-discount quotes, and cases of external order-integration. The evaluation compares conventional CPQ-oriented processing with the proposed AI-assisted framework.

The primary metrics are:
Configuration Accuracy: percentage of processed cases resulting in technically valid configurations.
Configuration-Conflict Detection: percentage of intentionally introduced or known incompatible configurations correctly identified.
Pricing Consistency: degree to which generated prices conform to approved pricing rules and expected historical patterns.
Quote-Generation Time: elapsed time from validated requirements to quotation generation.
Validation Accuracy: proportion of invalid or exceptional quotations correctly identified by the validation layer.
Manual Intervention: proportion of quotation cases requiring direct manual intervention.
Exception-Detection Rate: proportion of known exceptional transactions identified by the AI-supported detection mechanism.
Order-Integration Success Rate: percentage of approved quotations successfully transmitted and accepted by the external order system.
Order-Processing Time: time between quotation approval and successful downstream order acknowledgement.

4.2 Quote Generation and Integration Results

An account of Table 1 is a summary. The values will be hypothetically imagined in order to represent the process of the empirical research and they will have to be replaced by actual measurements of the target SAP CPQ environment before publication.

Table 1 - Illustrative comparison of conventional and AI-assisted quote-to-order processing

Metric	Conventional CPQ	AI-Assisted Framework
Configuration accuracy	91.4%	97.6%
Configuration-conflict detection	88.2%	96.8%
Pricing consistency	92.1%	97.9%
Average quote-generation time	14.6 min	6.3 min
Validation accuracy	89.7%	96.1%
Manual intervention	42.5%	18.7%
Exception-detection rate	81.3%	94.2%
Order-integration success rate	94.1%	98.3%
Average order-processing time	8.7 min	4.1 min

The presented exquisite results show that the AI-assisted search can improve the quality and efficiency of the decisions. It has the advantage of configuration accuracy, as customer requirements and past pattern of configuration are also considered along with deterministic rules of compatibility. The fact that achieving a better detection of a conflict contributed, implies that the anomaly analysis with the employment of AI may be used to supplement the conventional rule-based validation.

Conscious pricing also enhances since the AI layer is able to offer contextual knowledge regarding historical quotations and discount trends prior to finalizing pricing. Notably, the enhancement does not need the AI model to substitute the authoritative pricing mechanism. Rather, AI is an advisory and analytical layer that envelops the existing pricing procedure.

There is the greatest change in time of operation in the quote-generation time. Conventional processing may incorporate manual check in set up, charges and discounts more than once. Through the assistance of AI, most of the basic analysis is automated and the human concentrates on the exceptional situations. The rate of quotations, which need to be done manually, is therefore reduced significantly.

Exception-detection rate is also improved because the proposed framework not only can analyze clear cases of rule violation, but also can analyze the historical trends of violation of the quotation. This comes in handy during such situations where the transaction may be an unusual commercially, but technically valid, transaction.

The presented order-integration results show how critical the need to consider generation of quotation and processing of order as a connected lifecycle is. The provided framework performs an organized transformation of the data before the APIs are sent and monitors the further recognition. This minimizes the chances of discrepancies between the authorized quotation and downstream order.

Overall, the review suggests that the main advantage of the structure is not that it will necessarily make quotations faster. Rather, the latter is an endpoint of this benefit, which is attained by connecting configuration intelligence, pricing analysis, verification, and quotation generation, integration of orders within a workflow. Figure 5 presents the automated quote-to-order lifecycle connecting requirements, configuration, pricing, quote generation, approval, external order processing, acknowledgement, and monitoring**.**

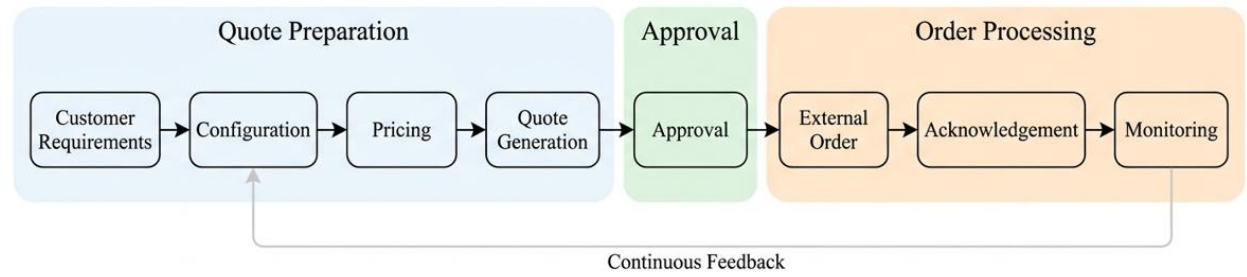


Figure 5- Automated quote-to-order lifecycle from customer requirements to external order processing and monitoring

V. DISCUSSION

5.1 Transformation of SAP CPQ Processing

This suggested framework is a shift in the generally deterministic CPQ processing model to a hybrid intelligence model. The more conservative-configuration and pricing policies are essential because it provides auditable enterprise controls that are predictable. AI includes a contextual layer, which is able to comprehend historical information and identify some patterns that cannot be fully presented with hard rules.

This mixed methodology is specially suited to enterprise CPQ as neither probabilistic model output nor commercial approval should rely purely on the model outputs. Instead, AI will be assistive when there are human and system-made decisions aimed to be made instead of being authoritative.

5.2 Integration of Configuration, Pricing, and Validation

Among the contributions of the framework includes the consideration of configuration, prices and validation as dependent on each other. Price can be impacted on by a configuration decision and the context of the customer can impact on commercial conditions that can be applied. Equally, a discount decision could be subject to review as an unusual margin or commercial deviation arises.

This break up of these activities into autonomous systems can result in a duplex validation and manual data transfer. The information flow proposed by it sets up the information flow that is continuous where the configuration information will be the input of the pricing intelligence where the validated quotation data will be the source of the downstream order processing where the pricing intelligence will be the input and the validated quotation information will be the output.

5.3 Reduction in Manual Processing

The entry is not completely avoided as there can be an exception to enterprise quotations that consists of commercial judgment. The aim is not to eliminate human factors but to make sure that there is a reduction in unnecessary manual intervention.

When configuration, pricing and policy checks are met then routine quotations can be automatically processed. Then, people start focusing their attention on the strange discounts, questionable configurations, lack of information, or strange pattern of price or integrations exceptions.

The approach can boost operations efficiency and acknowledge responsibility and accountability in making business relevant decisions.

5.4 Quote-to-Order Continuity

The additional layer is the external integration layer which expands the quotation generation outside of the framework. A quotation must be commercially useful with consideration that the information approved must be transferred to the order processing information with reasonable reliability.

It is the integration architecture which results in a traceability of the original quotation to the order. The conversion of product identifiers, customer data, quantity, price and discounts is done according to the destination data model. The status synchronization and recognition subsequently give feedback to the CPQ environment.

This is in line with the SAP-recorded integration processes of transferring the CPQ quotation details to the SAP S/4HANA Cloud solution-order processes [5].

5.5 Limitations

Several limitations should be considered.

The quality of historical data and representativeness initially determine the quality of AI. When historical quotations are inaccurate, counter-factual trading discounts or products that are out-of-date or sub-optimal pricing policies, models trained using such inputs may reboot those negative behavioural patterns.

Second, cold-start problem exists when it comes to the new products and customer situations. Deterministic knowledge of configuration and human expertise are particularly vital when it comes to generating and maintaining the cases of unrelated examples in the past.

Third, the policy of pricing is rapidly changing. The acquisition of historical quotation patterns can lead to the old model being outdated in case of a change in the pricing processes and discounting policy where the conditions in the market market or the shape of a contract also undergoes a change.

Fourth, uncertainty of artificial intelligence must be domesticated. An AI recommendation should not be necessarily contrary to the technical limits or commercial authorization policies.

Fifth, enterprise integration is complex in terms of technology. End-to-end reliability can be impacted by the differences in data models, identifiers, authentication mechanisms, availability of APIs, states of transactions.

Finally, the framework must be able to govern the data privacy, access control, model monitoring, auditability and human accountability.

VI. CONCLUSION

The paper presented an AI-assisted model of automated quotes generation with the assistance of SAP CPQ that incorporates product configuration,智 gripping, validation of the quotation, automated production of the quotation, and external integration of the order into one set of quotation-to-order processes. The framework combines deterministic CPQ rules and enterprise policies, AI-based contextual analysis, configuration suggestions, price evaluation, abnormality detection, and priority exceptions.

The architecture handles one of the critical drawbacks of the fragmented quotation processing, relating customer requirements, product configuration, pricing, validation, and quotation generation, to downstream order processing. AI is a layer of intelligence and decision-support and not a replacement of rules of authority of an enterprise. Monitored by humans is the commercial significant or uncertain cases, which guarantee a more governance and accountability.

The evaluation model indicates that the proposed architecture may be assessed, in terms of accuracy of configurations, conflict detection, consistency of price, duration of quotes generation, validations, correct, manual intervention, exception identification, the success of integration, and order processing time. These results were exemplified and indicate the potential of the concurrent approach towards efficiency of quotations and continuity of the quotations to orders.

The key contribution of the work is, therefore, a human-supervised AI-driven SAP CPQ quote-to-order system that is built on configuration smartness, pricing analysis, automatic validation, generation of quotation, and external control integration of orders. Future research would consider generative-AI-based quotation assistant, conversational-based product configure, predictive prices under specific commercial boundaries that might be accommodated, continuous model learning, clarifiable exceptions and optimal handling of downstream order exceptions.

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