International Journal of Emerging Research in Engineering and Technology
Pearl Blue Research Group| Volume 4, Issue 4, 112-123, 2023
ISSN: 3050-922X | https://doi.org/10.63282/3050-922X.IJERET-V4I1P112

Original Article

Building ROI-Driven Bots: From Insights Dashboards to Outcome Tracking

Adityamallikarjunkumar Parakala
Lead Rpa Developer at Department of Economic Security, USA.

Abstract *- In an era where data is in abundance, the usage of dashboards has been elevated to a new level, making them the standard way of presenting data. Despite their success in visualising data, they generally fail to let decision-makers touch the actual business impact. The term "decision-makers" here evokes images of people looking at metrics without any directions on what to do next. The lack of clarity in action-taking has led to the development of a new group of tools: ROI-driven bots. These smart agents, unlike the static dashboards, don't stop at only the reporting of performance—they actually take the users through the process, keep track of the value of activities, and keep on improving the flow between data and decisions. ROI-driven bots are the next step in the progression from insights dashboards to actionable outcome tracking. Instead of asking the leaders to comprehend the numbers and manually convert them into initiatives, these bots take over the function of intermediaries that not only present but also explain the given insights, thus allowing the timely interventions to be initiated and at the same time measuring the downstream effects of these interventions. Such as a bot that, instead of visualizing customer churn rates data, would go a step ahead and devise retention plans, engage with customers on the companies' behalf and then calculate the revenue saved from that. This move redefines analytics from serving as the basis for business decisions to actually prescribing the solutions and leading to results in business. ROI-driven bots are developed to point at performance issues and, at the same time, to incorporate the concepts of accountability and value measurement into the daily work processes.*

Keywords *- ROI-Driven Bots, Conversational AI, Automation ROI, Insights Dashboards, Outcome Tracking, Bot Analytics, AI Governance, Digital Transformation, Business Intelligence, Performance Measurement, Chatbot ROI.*

1. Introduction

1.1. The Rise of Conversational AI and Enterprise Chatbots

With time passing, conversational AI technology has become a "must-have" rather than a "nice to have" in the big enterprise ecosystem, to say the least. One of the most significant examples of how conversational AI has taken over the business landscape is in the field of customer services, where several companies have implemented this technology to optimize their customer service processes with huge savings in terms of human resources and operating costs, thus enhancing their customer experience and making it more scalable

Fig 1: Building ROI-Driven Bots: From Insights Dashboards to Outcome Tracking

A decade ago, enterprise conversational AI was still a novelty, and in that era, many businesses hesitated to adopt such technology, fearing it would overtake human roles or simply not deliver the promised results. Whereas most bots today are smart enough to reduce human work and provide great convenience, the business living behind the scenes just use them for this purpose and not to achieve strategic business results.

1.2. Problem Statement: The Limitations of Insights Dashboards

Simultaneously, businesses have also poured a lot of money into business intelligence software. Currently, the use of dashboards has become the most common way to measure KPIs, manage trends, and reveal insights. Although these dashboards may be aesthetically pleasant and informative, they are still often unchangeable. They state "what happened" but they do not go as far as

suggesting "what to do next". Therefore, executives and managers must interpret the data, come up with interventions, and manually link actions to outcomes. This lack of connection between information and influence creates a space where metrics are measured by dashboards but this does not necessarily mean the progress will be accelerated. Consequently, leaders often ask, 'What is the benefit of all these insights?'

1.3. Objective: Designing Bots That Go Beyond Insights

The goal of this paper is to analyse how ROI-driven bots can provide the missing link between dashboards and results. In contrast to regular chatbots, ROI-driven bots have a twofold mission: (1) to expose insights in natural language and context, and (2) to lead users to concrete actions that generate business value. It would be a better example if instead of the sales report showing a 5% decrease in conversions last quarter, an ROI-driven bot would pinpoint the areas where the sales performance is worse, propose the suitable sales campaigns, trigger the follow-up processes automatically, and then monitor the revenue growth as a result of these actions. By redirecting the emphasis from “reporting” to “return,” organizations are capable of unleashing the real potential of conversational AI. ROI-driven bots provide executives not only the power to grasp the condition of their enterprise but also the ability to drive it actively.

1.4. Scope of the Article

This article is a comprehensive, conceptualised and structured practical exposition of ROI-driven bots. It is divided into three parts:

- Framework: A simple framework for the creation and implementation of bots that bridge the gap between analytics and the real-world outcomes. It features the arrangement, the required abilities, and the basic design that indicate the distinctions between ROI-driven bots and the usual chat or reporting tools.
- Case Study: A real-life business environment example of how a company transitioned from dashboards to ROI-driven bots, providing a detailed explanation of the encountered problems, implemented solutions, and the positive business impact obtained.
- Best Practices: These consist of tips and lessons for big companies that want to follow this path, which include topics such as process management, user familiarization with new techniques, and ways of calculating ROI.

From the audience perspective, this will enable them to get a very clear picture of the design of bots that, on the one hand, are conversational but, on the other hand, are also outcome-oriented.

2. Evolution of Bots in Business

2.1. From Rule-Based Bots to NLP-Driven Assistants

The earliest business bot generation was rule-based systems that were created to function within narrowly defined boundaries. They essentially "acted" according to the pre-scripted decision trees and thus, when they were "triggered," gave predetermined answers. These bots, however, were stiff and sometimes annoying for users who deviated from the standard script. Natural language processing (NLP) introduction was a milestone. The assistants powered by NLP made the bots more versatile, which allowed them to detect the differences in human speech and therefore, to have more natural conversations.

2.2. Early Focus on Efficiency and Automation

Even though there has been a lot of improvement in technology, the main reason for using bots in their first few years was still to make processes more efficient. Organizations brought in bots in order to lessen the work that the staff had to do, reduce the time it took to respond, and get through the recurring tasks quickly. Customer service centers, for instance, implemented bots to manage FAQs and deflect routine tickets, thus saving several million dollars each year.

Fig 2: Efficiency Gains from Bots

This stage's value proposition was unambiguous: digitalization. Bots were the saving of time, were cost-efficient, and gave the staff the opportunity to concentrate on more challenging tasks. Still, efficiency alone does not equate with strategic impact.

2.3. Why ROI Focus Is the Next Stage of Maturity

Such an insight has caused the altered perspective in expectations. As well, in today's competitive surroundings, the executives want bots not only to take over the mundane tasks but to bring them a tangible outcome that can be eventually expressed through a return on investment. Said otherwise, it is the next stage of consumer maturity: ROI-focused bots. Not only is a bot powered by ROI the most trustworthy digital helper, but it is also the primary source of value for a company. Connecting data to goals, this bot quality of any action is now the possibility to increase the business profit. Let's say that instead of providing information about subscription plans, the ROI-oriented bot would foster the development of new sales opportunities, suggest personalized bundles, and be the first to convert the trade.

3. ROI as the North Star

3.1. Defining ROI in the Context of Bots

Return on Investment (ROI) is a measure that is primarily referred to as a financial metric but within the context of enterprise bots, it is a concept with wider, more strategic implications. Besides cost savings, the return on investment encompasses a wide range of factors, such as revenue generation, customer experience, employee productivity, and business impact overall.

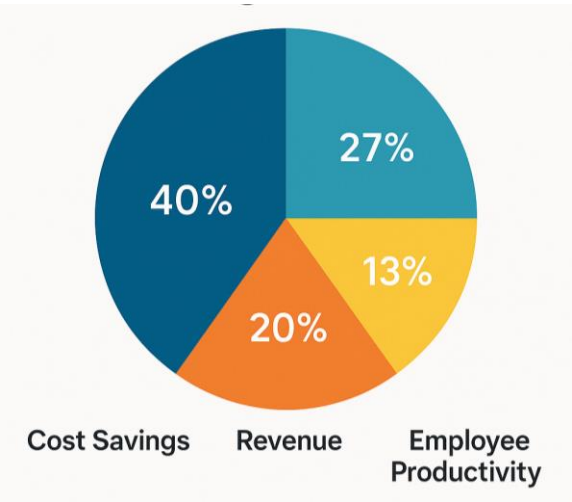

Fig 3: Defining ROI in Bots

- Cost Savings: The most direct and easily quantifiable ROI is generally the one resulting from a reduction in labor costs and improved operations. Bots are able to take over the large number of routine inquiries, that is the ones which are usually handled by human customer agents, and at the same time they can also automate the repetitive type of workflows
- Revenue Generation: Besides the mainstream efficiency, the introduction of ROI-driven bots is a strategy for actively contributing to being part of the top-line business growth.
- Customer Experience (CX) Improvement: The connection of ROI with the intangibles such as the loyalty of customers, their satisfaction, and retention has also been made by many. For example, those bots that provide prompt resolutions to complaints and offer personalized recommendations, as well as, most importantly, guarantee 24/7 support, may remarkably augment Net Promoter Scores (NPS) and Customer Satisfaction Scores (CSAT).
- Employee Productivity: Done right, the implementation of enterprise bots frees up valuable human employee time from dealing with repetitive tasks and lets workers focus on generating higher-value outputs.
- Employee Productivity: On the inside, bots save workers from doing boring, repetitive work, so they can concentrate on more strategic work. As an illustration, an HR bot may ease onboarding, handle leave requests, or bring a training course to the employee’s attention.

3.2. Aligning Bots with Business KPIs

For ROI-driven conversational agents to bring tangible profits, it is crucial that they be closely linked with the business core performance metrics (KPIs). This association not only categorises bots as mere tech innovations but also as an integral part of the strategic plan.

- Revenue KPIs – If the major objective is to achieve higher revenue, the improvement of the company can be driven by creating a sales bot which will be tracked through, for example, conversion rates of upsells, average order value, or lead-to-customer ratios.
- Efficiency KPIs – Bots can be related to the numbers needed for the company to reduce costs, such as average handling time (AHT) reduction, deflection rates, or cost per interaction.
- CX KPIs – Customer-centric strategies may use bots that are evaluated on first-contact resolution rates, CSAT, or NPS improvements.
- Employee KPIs – The internal use cases could be measured by the reduction of IT ticket volume, time-to-resolution for HR queries, or employee engagement survey scores for ROI purposes.

The main thing is that bots are not separate entities. Each bot should have “line of sight” to company goals. This means there must be a very tight connection of product/business stakeholders and technical teams during design and rollout.

3.3. Common Pitfalls in Measuring ROI

Organisational return on investment (ROI) is often the leading factor to be taken into account when making decisions. However, the majority of corporate organisations tend to make errors symmetrical to those mentioned in the article when trying to unravel the value of the ROI:

- Overemphasis on Cost Savings : a great number of businesses limit the ways of measuring the return on investment just to the areas of cost savings and efficiency without giving a thought to the rest of the customer experience (growth and CX dimensions).
- Lack of Baseline Metrics: It is necessary to have a comparison of before and after situations in order to calculate the ROI. The lack of baseline data on costs, revenue, or CX makes it difficult to demonstrate the positive impact of bots.
- Measuring Activity Instead of Outcomes: A large number of organizations are obsessed with purely quantitative data such as the number of bot conversations or completion rates, which lead to vanity metrics.
- Ignoring Intangible Value—Customer satisfaction and brand perception, as well as employee morale, are some of the factors that are very difficult to measure but still very important.
- Fragmented Measurement Across Functions: Most of the time, the ways different departments measure ROI are not the same, leading to the creation of silos.
- Short-Term Measurement Horizon: It takes time for bots to fully develop and improve. Hence, if the return on investment is measured prematurely, it may be underestimated.

3.4. ROI as a Strategic Compass

Rethinking the entire organization with ROI being the number one priority for the Bot's mission, companies will radically depart from their usual way of thinking, their procedures and the technologies they use. The query changes from "Is the bot working properly?" to "How is the bot delivering value?" C-Suite Executives can take initiatives in conversational AI from the status of technological laurels to business enablers by, first, defining the ROI in terms of cost, revenue, and experience; secondly, employing business KPIs as the performance indicator for the bot; and, thirdly, avoiding the common errors.Organizations using ROI as the framework for performance measurement receive the confidence needed to make sound decisions. In addition, it provides the teams with an ongoing improvement model and embeds technology as a means of delivering business results.

4. From Insights Dashboards to Outcome Tracking

4.1. Traditional Dashboards: Descriptive vs. Prescriptive Insights

Dashboards have long been the core of decision-making in large companies. They gather information from different systems, display the vital indicators visually, and give a leader an idea about how the organization is performing through snapshots.

Generally, the dashboards are either

- Descriptive dashboards: As the name suggests, these answer the question 'What happened?'. They display the past company's data in the form of charts, tables, and trends. A sales dashboard can be a representation of sales in one quarter, a win/loss ratio, or the rate of customers leaving a company.
- Prescriptive dashboards: with a higher level of complexity, these dashboards take users to the next step by showing them possible actions through the embedding of predictive analytics and giving recommendations. A prescriptive dashboard, for example, may not only illustrate a decrease in conversion rates but also suggest the implementation of the targeted campaigns or the utilization of new sales tactics. Nevertheless, they are still mainly advisory in nature. Both descriptive and prescriptive dashboards are useful to some extent, but they have a major common disadvantage: they shift the responsibility of taking action to humans.

Fig 4: Descriptive Vs. Prescriptive Dashboards

4.2. Limitations of "Report-Only" Models

Traditional dashboards, though often filled with data, are plagued by several issues when it comes to turning the data into outcomes:

- Passive Information Delivery : Dashboards present numbers but do not finish the cycle with what those numbers mean in reality. For instance, a dashboard could display a rising trend of customer complaints; however, it does not facilitate a prompt solution.
- Decision Latency : It might be that by the time executives have a look at the dashboards, done the trend analysis, and prepared a reply, the window of opportunities is already closed. Waiting to respond to a decline in customer satisfaction can lead to turnover at a faster pace.
- Limited Accessibility : Dashboards are commonly kept in separate BI platforms or are difficult for a non-technical person to understand. The employees who are on the front line and have the most impact on the results might not have the chance to use them.
- Focus on Reporting, Not Outcomes : The primary success factor is not the extent to which a dashboard efficiently reports data but rather the extent of the organization's actions that are derived from the data. Report-only models are usually limited to "what we know" stage, lacking the translation into "what we did" or "what we When organizations become more experienced, the drawbacks turn into the indicators that point to the necessity of a brand-new system: that is the one where dashboards are changed into systems of action and accountability.

4.3. Conversion Funnels and Journey Mapping

In essence, outcome tracking is all about the use of real-time feedback loops. Contrary to static dashboards that only get updated from time to time, ROI-driven bots keep on checking the metrics, are on the lookout for any triggers, and evaluate the results. Hence, a cycle of improvement is formed:

- Observation: The bot looks at the data to find changes or chances (e.g., falling engagement, increasing support tickets).
- Intervention: The bot recommends or takes the necessary corrective actions (e.g., providing discounts, raising issues, starting workflows).
- Measurement: The bot through operational KPIs and lagging indicators, measures the intervention results.
- Adaptation: According to the results, the bot adjusts its suggestions or the automation; thus, each time it gets better and better.

Such real-time feedback loops make it possible for the organizations to not only be able to make their reactions quarterly but also to make continuous, incremental improvements.

5. Technical Architecture for ROI-Driven Bots

The creation of bots whose functionality is greater than mere efficiency and that actually provide a return on investment (ROI) requires the technical architecture of a substantial kind. Such ROI-based bots need to be deeply embedded in the company's various systems, be constantly collecting and processing data, and most importantly, be linking their activities to tangible business results, unlike the usual chatbots which just perform intent recognition and execute pre-defined scripts.

5.1. Data Pipelines: Ingesting Enterprise and Conversational Data

ROI-driven bots heavily rely on data. In order to evaluate their influence, the bots need to collect data not only from different enterprise systems but also from their own interactions with users.

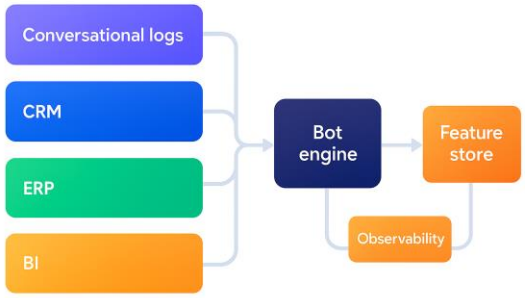

Fig 5: Bot Engine

- Conversational Data: Each user-bot conversation is a source of context, sentiment, and intent signals. These conversations are collected, anonymised, and kept for both on-the-fly decision-making and long-term usage.
- CRM Systems : The integration with services like Salesforce, HubSpot, or Microsoft Dynamics enables bots to fetch customer profiles, pipeline status, and deal histories, etc. without any problems.
- ERP Systems: The bots are facilitated to obtain the operational and financial data through the ERP's privilege, such as SAP, Oracle, or Workday.
- Analytics and BI Tools: The data coming from these tools like Tableau, Power BI, or Looker, is used to bring the bot's knowledge to the next level.

Organizations generally use streaming data pipelines (for example, Kafka and Kinesis) or ETL/ELT platforms (such as dbt and Fivetran) to handle such data heterogeneity.

5.2. Integration Layers: APIs, Middleware, and AI Orchestration

- APIs: Non-ambiguous APIs are the fundamental connecting parts of ROI-driven bots. CRM APIs allow the bot to fetch customer histories; ERP APIs expose inventory or financial records; HR APIs provide employee data. Besides access, APIs also enable bots to perform the tasks on the systems—updating leads, generating purchase orders, or logging service tickets.
- Middleware: Middleware solutions (e.g., MuleSoft, Boomi) simplify these integrations by offering prebuilt connectors, data transformations, and sequence logic. This layer eases the communication between different systems by standardizing it.
- AI Orchestration Layer: The AI orchestration engine is the component that combines different language models, decision engines, and analytics services in ROI-driven bots. This layer defines the way the bot understands the user's intent, picks the most suitable data, manages the workflows, and sends the responses.
    - Natural Language Understanding (NLU) gets the intent and the entities.
    - Business Logic Engines determine enterprise actions based on the intent.
    - Recommendation Models foresee the best way to go that will result in a maximum ROI.
- Workflow Engines allow the tasks to be done in all the systems that the bot has interacted with and these tasks to be in accordance with the enterprise rules.
- This integration fabric is the mechanism through which ROI-driven bots are not standalone tools but are deeply embedded, as actors, within the broader digital ecosystem.

5.3. Feedback Loop Design: Reinforcement Learning and Human-in-the-Loop

ROI-driven bots are most definitely characterised by their capacity to acquire knowledge on a continuous basis from the eventual results. Unlike static bots, which carry out scripts, ROI-driven bots adjust their tactics based on the actual-world outcome. In order for this to work, feedback loops have to be properly constructed.

- Reinforcement Learning (RL): Bots employ RL to bestow the decision-making process with the most efficient path by the reception of "rewards" or "penalties" corresponding to the results of their actions.
- Operational KPIs as Rewards: The main condition that makes reinforcement learning efficient is the linkage to significant metrics. Customer service KPIs, such as first-contact resolution or CSAT, can be utilised as indicators of rewards.
- Human-in-the-Loop (HITL) Mechanisms: The bots shall not be completely or fully autonomous. The human feedback not only guarantees business priorities and morals but also that the system is in line with them.
- Continuous Monitoring: In addition to RL and HITL, continuous monitoring can detect anomalies or side effects that were not intended. For example, if a bot's discount strategy increases conversions but decreases margins, an alert will enable a corrective action to be taken.

The multi-level feedback process helps bots to do the tasks as well as to gain new knowledge, improve and stay consistent with changing company objectives.

5.4. Visualization Layer: Dashboards Tied to Business Outcomes

Despite the fact that ROI-driven bots are architected to traverse beyond the dashboards, visualisation still remains an indispensable part of their functioning. The main point of difference is that these outcome-driven dashboards are not just concentrating on the bot's actions.

- Action-to-Outcome Mapping: In the first place, the dashboard should reflect what the bot did along with what the business impact was. Thus, while "Bot sent 1,000 retention messages" merely describes the activity, "Retention improved by 8%, saving $2M in revenue" tells the outcome of the activity.
- Leading and Lagging Indicators: The visualisations should incorporate both leading and lagging indicators to give a balanced view. Hence, leading signals may consist of a case in which early churn risk has been detected, whereas lagging results may show the actual churn that has been reduced.
- Role-Specific Views: The executives most probably will be looking for brief ROI overviews such as cost savings and revenue increments, while operational teams will be requiring detailed views such as ticket resolution rates and deal conversions.
- Closed-Loop Transparency: Feedback loops need to be openly visible in the visualization stage, showing not only which interventions were triggered but also how users responded to them and what results were achieved.
- By associating visualization directly with outcomes, enterprises change the role of dashboards from being mere passive reports to those of active accountability.

6. Governance, Security, and Compliance

As return-on-investment-driven bots are becoming an integral part of enterprise ecosystems, the issues of governance, security, and compliance are, thus, at the core of the enterprise's requirements rather than being considered as an afterthought. These bots operate confidential data, affect management decisions, and provide results that can be quantitatively measured. If adequate supervision is not present, they may lead to a breach of trust, break of rules, or an increase in bias. A green method calls for companies to maintain a fair mix of boldness and accountability.

6.1. Ensuring Ethical Use and Data Privacy

One of the most important aspects that start the ethical use of ROI-driven bots is the respect of data privacy. Bots get data from interactions, CRM, ERP, and analytics sources where there are often people's names, addresses, or other information that can be used to identify the person, financial data, or health records.

- Data Minimization: Bots ought to gather just that data which is necessary for them to complete their work. Let us assume, for example, that a customer support bot solving a question about billing doesn't need access to the user's complete history of purchases unless it is relevant.
- Anonymization and Encryption: Any sensitive data has to be anonymized for the purpose of analytics and encrypted both in transit and at rest. This makes sure that even data that have been intercepted cannot be utilized by unauthorized persons.
- Consent Management: Users should receive clear information about the logging of their interactions, and the opt-out mechanisms should be simple. Transparency is the main factor that builds up trust, especially in the case of customer-facing bots.
- Access Control: Role-based permissions should ensure that only authorized personnel can access sensitive logs or outcome data. The "least privilege" model is instrumental in risk minimization.

On the other hand, ethical use, in this case, is a mere extension of the privacy domain to cover the purpose of the bots. They should function in a way to provide the most benefits to users and companies and not be a tool for behaviour manipulation.

6.2. Regulatory Considerations: GDPR, HIPAA, and Industry Standards

ROI-driven bot enterprises are required to follow a diverse range of rules and regulations to avoid getting into trouble. If there is noncompliance, the enterprise can get monetary fines, lose its good name, and also be sued.

- GDPR (General Data Protection Regulation) – For organisations operating in the EU, GDPR puts in place a set of requirements for consent, data minimisation, and the "right to be forgotten". In such cases, bots need to have the feature where the user data is deleted upon request and be able to maintain the clear records of the activities of processing.
- HIPAA (Health Insurance Portability and Accountability Act) – In the healthcare field, HIPAA requires the installation of very strict security measures to protect the health information of the patient (PHI).

- Sector-Specific Standards – Besides that, financial services should pay attention to the PCI-DSS compliance in case bots are used to handle payment data, the smart government AI articulate security changes in the FedRAMP and NIST frameworks.

One of the most effective ways of implementing a compliance plan is to use the checks that come with the regulations as your default bot architecture. Automated data retention policies, audit trails, and compliance monitoring tools help to assure that the performance of ROI-driven bots is within legal boundaries as from the beginning rather than depending on after-the-fact remediation.

6.3. Avoiding Bias and Ensuring Explainability in Outcome Measurement

One major risk of return on investment (ROI)-focused bots is the presence of bias in the algorithm. If the bots are solely judged by the results of their actions, without limitations, they may take such steps that would lead to the optimisation of ROI only, leaving other things such as fairness out of the way.

Fig 6: Avoiding Bias

- Bias Audits: Audits regularly must test the recommendations of the bot along with results to find out if there are any demographic or contextual biases. Besides overall ROI, the metrics should track fairness across customer segments.
- Balanced KPIs: The outcome measurement of financial metrics should be integrated with fairness and compliance indicators. For example, a recruitment bot can be graded not only on the time taken to hire a candidate but also on the diversity of the shortlisted ones.
- Explainability: Bots are required to give the reasons for every step they take. It a bot has come up with a recommendation for a discount or has flagged a churn risk, then it should be able to provide the decision in simple, human-type terms. Apart from trust and accountability, regulatory defense also benefits from this openness.
- Human Oversight: Human-in-the-loop (HITL) review processes that are implemented firmly help ensure that human verification is done for sensitive decisions such as credit approvals or medical recommendations. Along with automation, oversight helps in the prevention of the occurrence of unintended harms.

Moreover, explainability is a crucial factor in adoption as well. The stakeholders would understand the measurement of the outcomes and the reasons for the chosen interventions only if they got the explanation from the ROI-driven bots. They are, therefore, more likely to trust and accept such bots.

7. Case Study: ROI-Driven Bot in Action

7.1. Background

Imagine a lifestyle products retailer of somewhat moderate size who sells via both an offline and an online store. The company committed a large amount of money to customer analytics platforms and BI dashboards. These instruments allowed detailed visibility into sales trends, churn rates, and customer satisfaction scores. However, even with so many insights, business leaders were repeatedly asking, "How do we turn these insights into measurable action?"

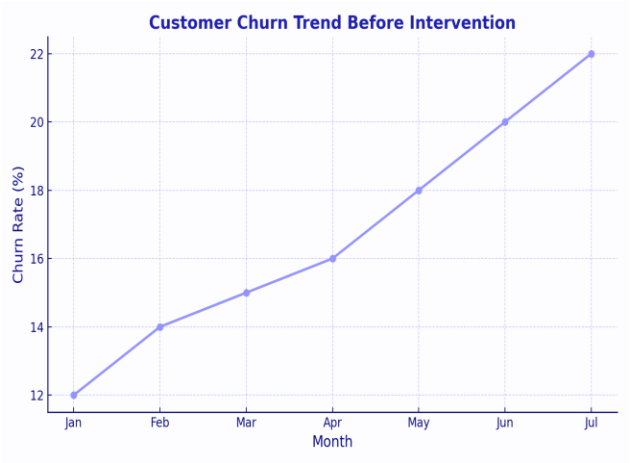

Fig 7: Customer Churn Trend before Intervention

The customer retention of the company had deteriorated. Repeat purchases were going down, and the churn of their subscription box service was increasing by almost 12% per year. Dashboards were able to illustrate the problem but gave little help in solving it. The leaders recognized that they required a solution that would be more action-oriented and smarter and hence go beyond just reporting to getting results and tracking them.

7.2. Challenges

The retail business had to deal with the following major problems:

- Limited Visibility Beyond Dashboards: Dashboards could show the KPIs but they didn't go as far as indicating the specific actions or giving the business value of the interventions.
- Decision Latency: Most of the insights were examined during quarterly or monthly meetings. Consequently, when the actions were put into practice, the customers had already left.
- Fragmented Customer Experience: The interactions were different in CRM, e-commerce platforms, and customer service. Due to this fragmentation, it was hard to unify the insights and take action in the same time.

Repeating these challenges served as a reminder that such a system is needed which can combine data, make intelligent decisions, and measure the impact at any time.

7.3. Implementation

The company collaborated with a conversational AI provider to create a bot that is ROI-driven, seamlessly integrated with their CRM, e-commerce platform, and analytics tools.

- Data Integration: The chatbot gathered information from user interactions, transaction histories, and churn risk models. Real-time data pipelines made it possible to send signals like cart abandonment, subscription cancellations, or negative feedback to the bot's decision engine.
- Outcome-Focused Design: The idea was to have the bot not only provide the answers to customer questions but also to track and influence key outcomes. Churn reduction, increase in repeat purchases, and raising of satisfaction scores are some of the outcomes that the bot was set to accomplish.
- Proactive Engagement: The bot was designed in a way that it could detect early churn indicators such as skipped subscription boxes, reduced order frequency, etc., and henceforth, it would reach out to the customers with retention offers like loyalty points, discounts, or personalized recommendations.
- Human-in-the-Loop: For customers of high value or those at risk, the bot would hand over the conversation to human agents with the full context, thus guaranteeing personalized service.
- Outcome Measurement: With each bot intervention, operational KPIs (discount acceptance rate, conversion rate, resolution time) and lagging indicators (actual churn reduction, revenue uplift) were linked. The redesign of dashboards was done to emphasise these outcomes instead of simply activity metrics.

7.4. Lessons Learned and Future Roadmap

Several lessons emerged during this deployment:

- ROI alignment is the most important aspect: The success of the bot was largely due to the fact that there was a clear alignment with business KPIs (churn, conversion, CSAT). In the absence of this, the initiative could have ended up being just another "nice-to-have" tool.
- Proactivity is the main driver of value: Bots which are only reactive in nature have limited scope. By spotting churn risks and taking the customer contact initiative, the bot was able to produce more than the expected results.
- Human oversight matters: For the sensitive or high-value customers, human-in-the-loop was the guarantee that automation did not violate trust.
- Iterative Optimization is the main thing: By A/B testing of scripts and offers, conversion strategies were improved, which is the evidence of the fact that continuous refinement results in increased ROI over time.
- Dashboards have to change: The transition from activity-based metrics ("number of chats") to outcome-based metrics ("revenue retained") was the factor that highlighted the bot's strategic impact.

The company is now looking forward to the bot taking on more responsibilities with the coming development of personalized marketing campaigns and employee productivity use cases. The leaders are picturing a scenario of bots who not only make customers happy but also make the workflow smoother, thereby creating more ROI, by means of further integration into ERP and HR systems.

8. Conclusion

For a long time, enterprises have counted on dashboards to be the basis of their decision-making process. These tools, while providing visibility, usually are not enough to lead to any implementation of the impact that has been measured. As organisations have to prove the technology investments more and more, the move from report-only dashboards to outcome tracking is becoming very important. Bots that are driven by ROI represent this change to a great extent by not only connecting the insights to results that can be measured but also by demonstrating through less churn, more conversions, reduced costs, or better customer experiences. The principal message of the story is that the main thing (the North Star) has to be ROI. The success of not how many dashboards are created or how many talks are managed by a bot, but by the amount of value those exchanges bring. Organisations may be certain of this and can use the method of combining their business KPI with bots, turning real-time feedback into a continuous loop, and joining the enterprise system to ensure that every digital interaction drives growth and competitive advantage. If we think about the future, we can say that the spot of decision-making paves the way for AI-driven systems. The role of bots will not be limited to just giving access to information, but they will be full-fledged actors who advise, recommend the next-best actions, trigger workflows, and co-evolve with the situation. Additionally, the intelligence is not static but keeps changing as new feedback comes in. The scenario is such in the future that wherever there will be a need for performance monitoring, not only will those organisations that use ROI-driven bots do it in a better and more efficient way, but they will also be in a position to take the lead in the areas of competition, innovation, and impact delivery. It's time to leave the old-school approach behind, take the lead in outcomes and allow ROI to lead the way forward.

References

[1] Eckerson, Wayne W. *Performance dashboards: measuring, monitoring, and managing your business*. John Wiley & Sons, 2010.

[2] Katangoori, Sivadeep, and Sushil Deore. “Predictive Drift Detection and Adaptive Reconciliation in Multi-Cloud Data Environments”. *The Distributed Learning and Broad Applications in Scientific Research*, vol. 8, Dec. 2022, pp. 247-74

[3] Allam, Hitesh. "Bridging the Gap: Integrating DevOps Culture into Traditional IT Structures." *International Journal of Emerging Trends in Computer Science and Information Technology* 3.1 (2022): 75-85.

[4] Datla, Lalith Sriram. “Postmortem Culture in Practice: What Production Incidents Taught Us about Reliability in Insurance Tech”. *International Journal of Emerging Research in Engineering and Technology*, vol. 3, no. 3, Oct. 2022, pp. 40-49

[5] Zorca, Suzana M., et al. "Clinical dashboards and adherence tracking: the good, the bad, the future?." *Journal of Cardiothoracic and Vascular Anesthesia* 35.10 (2021): 2977-2979.

[6] Jani, Parth. "Predicting Eligibility Gaps in CHIP Using BigQuery ML and Snowflake External Functions." *International Journal of Emerging Trends in Computer Science and Information Technology* 3.2 (2022): 42-52.

[7] Allio, Michael K. "Strategic dashboards: designing and deploying them to improve implementation." *Strategy & Leadership* 40.5 (2012): 24-31.

[8] Sinnott, Richard O., et al. "The Australian Digital Observatory: Social Media Collection, Discovery and Analytics at Scale." *International Conference on Big Data Intelligence and Computing*. Singapore: Springer Nature Singapore, 2022.

[9] Guntupalli, Bhavitha. "Exception Handling in Large-Scale ETL Systems: Best Practices". *International Journal of AI, BigData, Computational and Management Studies*, vol. 3, no. 4, Dec. 2022, pp. 28-36
[10] Bucalon, Bernard, et al. "State-of-the-art dashboards on clinical indicator data to support reflection on practice: scoping review." *JMIR medical informatics* 10.2 (2022): e32695.
[11] Balkishan Arugula, and Pavan Perala. "Multi-Technology Integration: Challenges and Solutions in Heterogeneous IT Environments". *American Journal of Cognitive Computing and AI Systems*, vol. 6, Feb. 2022, pp. 26-52
[12] Twohig, Patrick A., et al. "Clinician dashboard views and improvement in preventative health outcome measures: a retrospective analysis." *BMC health services research* 19.1 (2019): 475.
[13] Shaik, Babulal. "Developing Predictive Autoscaling Algorithms for Variable Traffic Patterns." *Journal of Bioinformatics and Artificial Intelligence* 1.2 (2021): 71-90.
[14] Dashboards, Performance. "Performance Dashboards: Measuring, Monitoring, and Managing Your Business." *Monitoring, and Managing Your Business, Second Edition by Wayne Eckerson* (2011).
[15] Katangoori, Sivadeep, and Sushil Deore. "Edge-Cloud Hybrid Data Pipelines: Architectures for Federated Analytics and Learning". *The Distributed Learning and Broad Applications in Scientific Research*, vol. 8, May 2022, pp. 215-46
[16] Verbert, Katrien, et al. "Learning dashboards: an overview and future research opportunities." *Personal and Ubiquitous Computing* 18.6 (2014): 1499-1514.
[17] Patel, Piyushkumar. "Robotic Process Automation (RPA) in Tax Compliance: Enhancing Efficiency in Preparing and Filing Tax Returns." *African Journal of Artificial Intelligence and Sustainable Development* 2.2 (2022): 441-66.
[18] Ahn, June, et al. "Designing in Context: Reaching beyond Usability in Learning Analytics Dashboard Design." *Journal of Learning Analytics* 6.2 (2019): 70-85.
[19] Anand, Sangeeta, and Sumeet Sharma. "Scalability of Snowflake Data Warehousing in Multi-State Medicaid Data Processing." *JOURNAL OF RECENT TRENDS IN COMPUTER SCIENCE AND ENGINEERING (JRTCSE)* 12.1 (2024): 67-82.
[20] Franklin, Amy, et al. "Dashboard visualizations: Supporting real-time throughput decision-making." *Journal of biomedical informatics* 71 (2017): 211-221.
[21] Datla, Lalith Sriram. "Infrastructure That Scales Itself: How We Used DevOps to Support Rapid Growth in Insurance Products for Schools and Hospitals". *International Journal of AI, BigData, Computational and Management Studies*, vol. 3, no. 1, Mar. 2022, pp. 56-65
[22] Guntupalli, Bhavitha, and Surya Vamshi Ch. "My Favorite Design Patterns and When I Actually Use Them". *International Journal of Emerging Trends in Computer Science and Information Technology*, vol. 3, no. 3, Oct. 2022, pp. 63-71
[23] Vázquez-Ingelmo, Andrea, Francisco J. Garcia-Penalvo, and Roberto Theron. "Information dashboards and tailoring capabilities-a systematic literature review." *IEEE access* 7 (2019): 109673-109688.
[24] Shaik, Babulal, and Jayaram Immaneni. "Enhanced Logging and Monitoring With Custom Metrics in Kubernetes." *African Journal of Artificial Intelligence and Sustainable Development* 1 (2021): 307-30.
[25] Hartzler, Andrea L., et al. "Integrating patient-reported outcomes into spine surgical care through visual dashboards: lessons learned from human-centered design." *eGEMs* 3.2 (2015): 1133.
[26] Allam, Hitesh. "Security-Driven Pipelines: Embedding DevSecOps into CI/CD Workflows." *International Journal of Emerging Trends in Computer Science and Information Technology* 3.1 (2022): 86-97.
[27] Yigitbasioglu, Ogan M., and Oana Velcu. "A review of dashboards in performance management: Implications for design and research." *International journal of accounting information systems* 13.1 (2012): 41-59.
[28] Jani, Parth. "Azure Synapse + Databricks for Unified Healthcare Data Engineering in Government Contracts". *Los Angeles Journal of Intelligent Systems and Pattern Recognition*, vol. 2, Jan. 2022, pp. 273-92
[29] Patel, Piyushkumar. "Navigating the BEAT (Base Erosion and Anti-Abuse Tax) under the TCJA: The Impact on Multinationals' Tax Strategies." *Australian Journal of Machine Learning Research & Applications* 2.2 (2022): 342-6.
[30] Clark, Bruce. "Marketing dashboards, resource allocation and performance." *European Journal of Marketing* 55.1 (2021): 247-270.
[31] Shaik, Babulal. "Automating Compliance in Amazon EKS Clusters With Custom Policies." *Journal of Artificial Intelligence Research and Applications* 1.1 (2021): 587-10.
[32] Arugula, Balkishan, and Pavan Perala. "Building High-Performance Teams in Cross-Cultural Environments". *International Journal of Emerging Research in Engineering and Technology*, vol. 3, no. 4, Dec. 2022, pp. 23-31
[33] Stadler, Jennifer G., et al. "Improving the efficiency and ease of healthcare analysis through use of data visualization dashboards." *Big data* 4.2 (2016): 129-135.
[34] Mohammad, Abdul Jabbar. "Blockchain Ledger for Timekeeping Integrity." *International Journal of Emerging Trends in Computer Science and Information Technology* 1.1 (2020): 39-48.
[35] Katangoori, Sivadeep, and Sushil Deore. "Lakehouse Architecture and the Semantic Revolution: Bridging Analytics and Governance With AI". *The Distributed Learning and Broad Applications in Scientific Research*, vol. 8, Sept. 2022, pp. 275-00.

[36] Patel, Piyushkumar. "Accounting for Supply Chain Disruptions: From Inventory Write-Downs to Risk Disclosure." *Journal of AI-Assisted Scientific Discovery* 1.1 (2021): 271-92.
[37] Guntupalli, Bhavitha. "Writing Maintainable Code in Fast-Moving Data Projects". *International Journal of Emerging Trends in Computer Science and Information Technology*, vol. 3, no. 2, June 2022, pp. 65-74
[38] Khairat, Saif Sherif, et al. "The impact of visualization dashboards on quality of care and clinician satisfaction: integrative literature review." *JMIR human factors* 5.2 (2018): e9328.