

ANA CAROLINA MALVEIRA FERREIRA

**Pipeline de Prospecção de Leads: Descoberta do Cliente,
Qualificação com *Lead Scoring* (ICP) orientado a *Customer
Success* com apoio de IA Generativa e iPaaS**

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Dissertação apresentada ao Programa de Pós-Graduação em Ciência e Tecnologia da Computação da Universidade Federal de Itajubá, como requisito parcial para a obtenção do título de Mestre em Ciência e Tecnologia da Computação.

Orientador: Prof. Dr. Adler Diniz de Souza

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Resumo

A prospecção e qualificação de clientes em projetos de desenvolvimento de websites frequentemente dependem de processos informais, sujeitos a ambiguidades na identificação de necessidades, definição de requisitos e avaliação do alinhamento entre cliente e fornecedor. Nesse contexto, esta pesquisa investiga como a Inteligência Artificial Generativa pode apoiar atividades de Descoberta do Cliente (*Customer Discovery*) e qualificação de leads orientadas aos princípios de *Customer Success*. Para isso, foi adotada a abordagem de *Design Science Research* (DSR), combinada a uma Revisão Sistemática da Literatura, visando fundamentar o desenvolvimento e a avaliação de um artefato tecnológico. Como resultado, foi proposto e implementado um pipeline de prospecção apoiado por Inteligência Artificial Generativa, composto por agentes conversacionais, integrações iPaaS e mecanismos de qualificação de leads responsáveis pelo diagnóstico de necessidades, geração de propostas iniciais, apoio ao fechamento de vendas e acompanhamento de oportunidades futuras. O pipeline foi integrado por meio de plataformas iPaaS e avaliado com especialistas e estudantes de pós-graduação representando potenciais usuários. Os resultados indicaram percepção positiva quanto à capacidade do pipeline de apoiar a identificação de necessidades, estruturar informações relevantes para o processo comercial e contribuir para a compreensão dos objetivos do cliente. As evidências obtidas sugerem que a abordagem proposta possui potencial para apoiar profissionais e pequenas empresas de desenvolvimento web na condução de processos mais estruturados de descoberta e qualificação de clientes. Como contribuição, a pesquisa demonstra a viabilidade de um pipeline de prospecção apoiado por Inteligência Artificial Generativa para apoiar etapas iniciais do relacionamento com clientes, integrando conceitos de Customer Discovery, Lead Scoring e Customer Success.

Palavras-chave: Inteligência Artificial Generativa. Customer Discovery. Customer Success. Qualificação de Leads. Lead Scoring. Desenvolvimento de Websites. Design Science Research.

Abstract

Client prospecting and lead qualification in website development projects often rely on informal processes, resulting in ambiguities in requirement elicitation, customer understanding, and decision-making. In this context, this research investigates how Generative Artificial Intelligence can support Customer Discovery and lead qualification activities aligned with Customer Success principles. A Design Science Research (DSR) approach combined with a Systematic Literature Review was adopted to support the design and evaluation of a technological artifact. As a result, an AI-supported prospecting pipeline was proposed and implemented, comprising Generative AI conversational agents, iPaaS integrations, and lead qualification mechanisms responsible for lead qualification, needs diagnosis, proposal generation, sales support, and follow-up activities. The pipeline was integrated through iPaaS platforms and evaluated with specialists and graduate students representing potential users. The results indicated positive perceptions regarding the pipeline's ability to support needs identification, structure relevant information for commercial processes, and improve understanding of customer objectives. The findings suggest that the proposed approach has the potential to assist web development professionals and small digital service businesses in conducting more structured customer discovery and lead qualification processes. The main contribution of this research is the demonstration of how Generative AI agents can be applied to early-stage customer interactions by integrating Customer Discovery, Lead Scoring, and Customer Success concepts into a unified prospecting pipeline.

Keywords: Generative Artificial Intelligence. Customer Discovery. Customer Success. Lead Qualification. Lead Scoring. Website Development. Design Science Research.

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1. Introdução

A evolução das tecnologias digitais tem transformado profundamente a forma como empresas e profissionais interagem com clientes no ambiente online. No campo do desenvolvimento de websites, essa transformação tem exigido não apenas soluções técnicas sofisticadas, mas também abordagens mais estratégicas e orientadas à experiência do usuário. Nesse contexto, a inteligência artificial (IA) — especialmente em sua vertente generativa — tem se destacado como uma ferramenta promissora para potencializar a eficiência de processos criativos e comerciais.

A aplicação da IA generativa em design gráfico e desenvolvimento web tem se mostrado eficaz na automação de tarefas repetitivas (Gmeiner et al., 2023), na geração de ideias (Choi et al., 2024) e na personalização de interfaces (Wasilewski & Kolaczek, 2024). Contudo, observa-se uma lacuna quando se trata da etapa inicial do relacionamento com o cliente: a prospecção. Para profissionais autônomos e pequenas empresas de desenvolvimento web, a qualificação de leads representa um desafio contínuo, que demanda tempo, energia e disponibilidade — muitas vezes sem retorno garantido.

Neste cenário, surge a proposta de desenvolver um pipeline de prospecção apoiado por Inteligência Artificial Generativa voltada à automação da prospecção de clientes. Inspirada nos princípios de Customer Success (Sucesso do Cliente) e *Customer Discovery* (Descoberta do Cliente), o pipeline proposto incorpora agentes conversacionais capazes de conduzir entrevistas estruturadas, compreender descrições genéricas de problemas e propor soluções personalizadas, mesmo fora do horário comercial. Ao fazer isso, visa-se não apenas aumentar a eficiência do processo comercial, mas também aprimorar a experiência do cliente desde o primeiro contato.

Assim, esta dissertação tem como objetivo investigar e desenvolver um pipeline de prospecção apoiado por Inteligência Artificial Generativa que automatize a interação inicial com leads, promovendo maior autonomia ao desenvolvedor web e entregando valor ao cliente desde os primeiros minutos da jornada. A proposta está ancorada na interseção entre inteligência artificial, desenvolvimento web e técnicas de sucesso do cliente, com ênfase em uma abordagem prática e centrada no usuário.

1.1 Motivação

No contexto do desenvolvimento de websites, a prospecção de clientes representa um desafio recorrente, especialmente para designers autônomos que atuam de forma independente. A ausência de ferramentas inteligentes que auxiliem na qualificação de leads compromete a eficiência do processo comercial, exigindo do profissional tempo e disponibilidade para responder manualmente a dúvidas frequentes, muitas vezes sem retorno garantido. Essa realidade evidencia a necessidade de soluções tecnológicas que promovam maior autonomia, tanto para o designer quanto para o cliente.

A motivação desta pesquisa reside no desenvolvimento de um pipeline baseada em inteligência artificial generativa, capaz de automatizar a interação inicial com potenciais clientes. A proposta é oferecer um sistema inteligente, operante de forma contínua e assíncrona, que funcione como um formulário de contato avançado, conduzindo entrevistas estruturadas com base em técnicas de Sucesso do Cliente. Essa abordagem possibilitará a identificação precisa dos objetivos do cliente e o direcionamento para soluções mais alinhadas às suas reais necessidades, mesmo fora do horário comercial, como em madrugadas, feriados e fins de semana.

Outro aspecto motivador deste trabalho é a aplicação dos princípios de Descoberta do Cliente, conforme proposto por Steve Blank (2021), a fim de compreender e validar o perfil do cliente ideal para esse tipo de serviço. Ao utilizar o pipeline como meio de aprendizagem sobre o mercado e o comportamento dos leads, busca-se reduzir o tempo e o esforço gastos com interações improdutivas, filtrando desde o início os clientes com maior potencial de sucesso e engajamento contínuo.

Com isso, almeja-se proporcionar aos web designers um ambiente de trabalho mais eficiente, autônomo e escalável, sem a necessidade de contratação de equipe para realizar tarefas repetitivas ou operacionais. Ao mesmo tempo, o pipeline proposto também oferece uma experiência mais rica ao cliente, que pode esclarecer dúvidas, conhecer soluções e até iniciar a contratação de forma fluida e personalizada.

1.2 Justificativa

A crescente digitalização dos serviços e a ampliação da presença online de empresas têm impulsionado a demanda por soluções inovadoras em desenvolvimento web, especialmente no que se refere à personalização da experiência do usuário e ao aumento da eficácia comercial. Nesse cenário, a aplicação de técnicas de inteligência artificial (IA), em especial a IA generativa, tem se mostrado promissora para aprimorar os processos de design gráfico e prospecção de clientes em ambientes digitais (Choi et al., 2024; Wasilewski & Kolaczek, 2024).

Estudos recentes demonstram que a IA pode acelerar a geração de ideias, personalizar interfaces de forma dinâmica e automatizar tarefas repetitivas, favorecendo a eficiência e a satisfação do usuário (Casteleiro-Pitrez, 2024; Namoun et al., 2024). Apesar desses avanços, ainda persistem desafios relacionados à transparência dos modelos, à usabilidade das ferramentas e à dificuldade de equilibrar a automação com o controle criativo humano (Gmeiner et al., 2023; Zhou et al., 2024). Tais barreiras comprometem a adoção mais ampla dessas tecnologias por profissionais da área de design e desenvolvimento web.

Dessa forma, esta pesquisa se justifica pela necessidade de investigar e desenvolver uma solução baseada em IA generativa que seja capaz de compreender as necessidades dos clientes de forma eficaz, conduzindo entrevistas, interpretando descrições genéricas de problemas e propondo protótipos personalizados com foco na entrega de valor. Ao integrar os princípios de Sucesso do Cliente e explorar abordagens centradas no usuário, a proposta busca não apenas otimizar o funil de vendas de empresas desenvolvedoras de websites, como também contribuir para o avanço do conhecimento sobre o uso estratégico da IA generativa em contextos reais de desenvolvimento web (Takafoli et al., 2024; Zhong et al., 2024).

Funil de vendas, este, apoiado sobre a primeira lei do Sucesso do Cliente, "Venda ao cliente certo" (Mehta et al., 2020), para garantir a entrada de clientes alinhados com o *product market fit* (PMF), ou seja, com aderência entre o produto ofertado e as necessidades reais do público-alvo da empresa de desenvolvimento web. Para tanto, é fundamental aplicar os princípios do processo de *Customer Discovery*, conforme proposto por Steve Blank (2021), que visa identificar os clientes

visionários, compreender suas necessidades, validar se o produto resolve um problema real e se esses clientes estão dispostos a pagar por ele.

Garantindo esta validação, fatores como perfil do cliente, ticket médio, nível de complexidade da solução, grau de automação possível e o momento da jornada do cliente serão usados para encaminhar o cliente para o fluxo correto. A pipeline proposto visa apoiar a prospecção de clientes *tech touch* haja vista que atualmente sabe-se da importância de criar, sistematicamente, programas que possibilitem interações pois, segundo a quinta lei de CS, "Não é mais possível construir a lealdade com relacionamentos pessoais" (Mehta et al., 2020). No caso de clientes classificados como *Tech Touch* — isto é, com baixo ticket médio —, torna-se fundamental automatizar as interações, respeitando o modelo de cobertura adequado ao seu perfil.

Sendo identificada a possibilidade de relacionamento com cliente *High Touch* (alto *ticket* médio), a pipeline proposto encaminha o cliente para atendimento humano, atuando como agente de qualificação inicial baseado em IA generativa, capaz de identificar o perfil e o momento do lead na jornada.

1.3 Objetivos

O objetivo geral desta pesquisa é desenvolver um pipeline baseado em Inteligência Artificial Generativa para automatizar o processo de descoberta do cliente e qualificação de leads em empresas de desenvolvimento de websites. O pipeline foi concebido para identificar o cliente ideal e apoiar práticas de Customer Success, contribuindo para a definição de escopo, a satisfação do cliente e a conversão de leads.

Para alcançar tal finalidade, estabelecem-se os seguintes objetivos específicos:

- Realizar uma revisão sistemática da literatura sobre o estado da arte da aplicação de inteligência artificial generativa no design gráfico e no desenvolvimento web orientado à experiência do usuário e ao sucesso do cliente;
- Projetar e implementar um pipeline de prospecção baseada em IA generativa que atue na etapa de *Customer Discovery*, identificando as necessidades, dores e perfil dos clientes de forma automatizada, a fim de validar o alinhamento com o produto e encaminhar o lead para o fluxo adequado (*Tech Touch* ou *High Touch*);
- Avaliar a eficácia do pipeline proposto com base em métricas como clareza na identificação de perfis, tempo de resposta, índice de satisfação dos usuários e potencial impacto na conversão de leads em clientes;
- Analisar a contribuição da abordagem para a melhoria dos processos de prospecção e desenvolvimento web, considerando aspectos de escalabilidade, aplicabilidade e alinhamento entre a etapa de descoberta do cliente e as práticas de Sucesso do Cliente.

1.4 Questões de Pesquisa

A definição das questões de pesquisa constitui uma etapa essencial para a delimitação do escopo investigativo e para o direcionamento das decisões metodológicas adotadas neste trabalho. Considerando o objetivo de desenvolver uma inteligência artificial generativa voltada à prospecção de clientes no contexto de desenvolvimento de websites, fundamentada nos princípios de Sucesso do Cliente, estabeleceu-se a seguinte questão principal:

Questão de pesquisa principal:

Como um pipeline de prospecção apoiado por Inteligência Artificial Generativa pode apoiar o processo de descoberta e qualificação de clientes ideais no contexto do desenvolvimento de websites, contribuindo para decisões estratégicas de design e para a aplicação de práticas de Sucesso do Cliente?

Questões de pesquisa secundárias:

1. Como a IA generativa pode automatizar o processo de descoberta do cliente, identificando se há aderência entre as necessidades do lead e a proposta da empresa de desenvolvimento web (*product-market fit*)?
2. De que maneira a IA generativa pode interpretar descrições genéricas de problemas, extraindo informações relevantes para qualificar o cliente e entender seu contexto de negócio?
3. Como a IA generativa pode otimizar entrevistas automatizadas, conduzindo à coleta de requisitos de forma personalizada, clara e eficaz?
4. Qual o impacto do uso da IA generativa no tempo de resposta, na percepção de valor e na satisfação do cliente durante o processo de prospecção?
5. De que forma a pipeline proposto contribui para a aplicação de métricas de Sucesso do Cliente e para o aumento da conversão de leads em clientes efetivos?

1.5 Produção Científica Associada à Dissertação

Os resultados desta pesquisa foram consolidados na forma de produção científica, em conformidade com as diretrizes vigentes do Programa de Pós-Graduação em Ciência e Tecnologia da Computação da Universidade Federal de Itajubá.

O trabalho desenvolvido durante o curso de mestrado teve como objetivo investigar a aplicação da Inteligência Artificial Generativa no processo de descoberta e qualificação de clientes em projetos de desenvolvimento de websites, resultando na proposição e avaliação de um pipeline de prospecção orientado aos princípios de Customer Discovery, Lead Scoring e Customer Success.

Como resultado, a pesquisa originou três produções científicas que contemplam as diferentes etapas do estudo, desde a revisão da literatura até o desenvolvimento e avaliação do artefato proposto:

1. *Artificial Intelligence in Graphic Design for Web Development: A Systematic Literature Review Focused on Customer Success*, artigo aceito para publicação na International Conference on Information, Intelligence, Systems and Applications (IISA 2026);
2. *AI-Supported Client Discovery and Lead Qualification: A Human-AI Decision Support Pipeline for Web Development*, artigo aceito para publicação na International Conference on Information, Intelligence, Systems and Applications (IISA 2026);
3. *Evaluating an AI-Supported Customer Discovery and Lead Qualification Pipeline for Website Development*, artigo submetido ao 32º Simpósio Brasileiro de Sistemas Multimídia e Web (WebMedia 2026).

O primeiro artigo apresenta os resultados da Revisão Sistemática da Literatura realizada para identificar o estado da arte da aplicação da Inteligência Artificial no design gráfico e no desenvolvimento web orientado à experiência do usuário e ao Customer Success. O segundo artigo descreve o desenvolvimento do pipeline de prospecção proposto, incluindo sua fundamentação conceitual, arquitetura e implementação. O terceiro artigo apresenta a avaliação do artefato

desenvolvido, analisando sua aplicação no contexto de descoberta e qualificação de clientes para projetos de desenvolvimento de websites.

Os artigos são apresentados nos Apêndices A, B e C desta dissertação e constituem os principais resultados científicos produzidos no âmbito da pesquisa.

Em conjunto, essas produções científicas representam as diferentes etapas da presente pesquisa, compreendendo a fundamentação teórica, o desenvolvimento do artefato e sua avaliação experimental.

1.6 Stakeholders envolvidos na pesquisa

O pipeline de prospecção proposto envolve diferentes atores que participam do processo de descoberta do cliente, qualificação de leads, desenvolvimento da solução e avaliação do artefato. A Tabela 1 apresenta os principais stakeholders considerados nesta pesquisa, seus respectivos papéis e sua participação ao longo das diferentes etapas do pipeline.

Tabela 1 – Stakeholders da pesquisa

Stakeholder	Papel na pesquisa	Participação no pipeline
Lead (potencial cliente)	Fornece informações sobre seu negócio, necessidades e objetivos durante a etapa de Customer Discovery.	Interage com os agentes conversacionais, responde às entrevistas e recebe a proposta inicial.
Profissional de desenvolvimento web	Usuário principal do artefato, responsável pela análise das informações coletadas e pela tomada de decisão comercial.	Utiliza os resultados da qualificação para definição de escopo, elaboração da proposta e continuidade do atendimento.
Agentes de IA Generativa	Conduzem entrevistas, estruturam informações, qualificam leads e auxiliam na geração de propostas.	Automatizam atividades do pipeline, apoiando a coleta, organização e interpretação das informações.
Empresa desenvolvedora de websites	Organização beneficiada pela adoção do pipeline.	Utiliza o processo para tornar a prospecção mais estruturada, escalável e alinhada aos princípios de Customer Success.
Especialistas	Avaliaram o artefato durante o pré-teste (avaliação ex ante).	Forneceram sugestões para aperfeiçoamento da solução antes da avaliação com usuários.
Participantes da avaliação (leads)	Avaliaram o pipeline durante a etapa experimental (avaliação ex post).	Interagiram com o artefato e responderam aos instrumentos de avaliação, fornecendo evidências sobre sua utilidade e usabilidade.

Fonte: Elaborado pela autora (2026).

2. Discussão

2.1 Contribuições do artefato para a Descoberta do Cliente

Os resultados obtidos durante a avaliação sugerem que o artefato proposto contribui de forma positiva para atividades associadas à Descoberta do Cliente (Customer Discovery). As maiores médias observadas no questionário pós-uso estiveram relacionadas à identificação de necessidades (Q1 = 4,4) e à compreensão das próprias necessidades após a interação com o pipeline (Q8 = 4,5). Esses resultados indicam que os participantes perceberam valor na condução estruturada das entrevistas realizadas pelos agentes conversacionais de Inteligência Artificial Generativa.

Sob a perspectiva de Customer Discovery proposta por Blank (2021), a identificação de problemas, necessidades e objetivos constitui uma etapa fundamental para a validação de hipóteses e para a compreensão do contexto do potencial cliente. Os resultados obtidos sugerem que a utilização de agentes conversacionais apoiados por Inteligência Artificial Generativa pode auxiliar nesse processo, conduzindo entrevistas estruturadas e incentivando a reflexão sobre aspectos que nem sempre são explicitados em abordagens tradicionais de prospecção.

Os comentários qualitativos reforçam essa interpretação. Diversos participantes relataram que as perguntas realizadas pelos agentes contribuíram para organizar ideias, identificar funcionalidades relevantes e refletir sobre requisitos que não haviam sido considerados inicialmente. Dessa forma, o artefato demonstrou potencial para apoiar atividades de descoberta e levantamento inicial de requisitos, reduzindo ambiguidades e favorecendo uma compreensão mais clara das necessidades do cliente.

Os resultados observados estão alinhados com estudos que apontam o potencial da Inteligência Artificial para apoiar processos de interação, personalização e construção colaborativa de conhecimento em contextos de design e desenvolvimento digital. Nesse sentido, o artefato proposto amplia a aplicação dessas tecnologias para uma etapa ainda pouco explorada pela literatura: a fase inicial de descoberta e qualificação de clientes.

2.2 Contribuições para a qualificação de leads e para Customer Success

Além de apoiar a etapa de Descoberta do Cliente, os resultados obtidos indicam que o artefato também contribui para a qualificação estruturada de leads. A proposta desenvolvida combina princípios de Customer Discovery com mecanismos de Lead Scoring orientados ao Perfil de Cliente Ideal (ICP), permitindo que informações coletadas durante a interação sejam utilizadas para apoiar decisões relacionadas ao encaminhamento e à priorização de potenciais clientes.

Sob a perspectiva de Customer Success, essa abordagem está alinhada à primeira lei proposta por Mehta, Steinman e Murphy (2020), segundo a qual o sucesso do cliente começa pela capacidade da organização de vender para o cliente certo. Nesse contexto, a identificação precoce do alinhamento entre as necessidades do lead e a proposta de valor da empresa torna-se um fator relevante para aumentar as chances de sucesso do relacionamento e reduzir esforços direcionados a oportunidades com baixa aderência.

Os resultados observados durante a avaliação sugerem que a estrutura proposta foi capaz de apoiar esse processo ao organizar informações relevantes sobre objetivos, desafios, nível de maturidade digital e expectativas dos participantes. A combinação entre entrevistas estruturadas e critérios objetivos de qualificação permitiu transformar informações originalmente dispersas em elementos que podem ser utilizados para apoiar a tomada de decisão durante as etapas iniciais da prospecção.

Outro aspecto relevante refere-se à capacidade do artefato de padronizar atividades que normalmente dependem exclusivamente da experiência individual do profissional responsável pela prospecção. Em pequenos estúdios e contextos de atuação individual, processos de qualificação frequentemente são conduzidos de maneira informal, o que pode resultar em interpretações inconsistentes e dificuldades na comparação entre oportunidades. A utilização de um pipeline estruturado contribui para reduzir essa subjetividade, oferecendo critérios mais consistentes para avaliação dos potenciais clientes.

Os resultados obtidos também indicam que a Inteligência Artificial Generativa pode desempenhar um papel complementar ao processo decisório humano. Em vez de substituir a análise realizada pelo profissional, o sistema atua como mecanismo

de apoio, organizando informações, conduzindo entrevistas e produzindo artefatos intermediários que auxiliam na compreensão do contexto do cliente. Essa abordagem está alinhada à perspectiva de Human-in-the-Loop adotada nesta pesquisa, na qual a decisão final permanece sob responsabilidade do profissional, enquanto a IA atua como suporte cognitivo para atividades de coleta, interpretação e estruturação de informações.

Dessa forma, os resultados sugerem que a integração entre Inteligência Artificial Generativa, Customer Discovery, Lead Scoring e Customer Success representa uma abordagem promissora para apoiar atividades de prospecção em empresas de desenvolvimento de websites, contribuindo para processos mais estruturados, consistentes e orientados à geração de valor.

2.3 Síntese das respostas às questões de pesquisa

Os resultados obtidos nesta pesquisa permitem responder às questões de pesquisa apresentadas na Seção 1.4. A Tabela 2 sintetiza as principais evidências observadas durante o desenvolvimento e a avaliação do artefato, relacionando cada questão de pesquisa às contribuições identificadas ao longo do estudo.

Tabela 2 – Síntese das respostas às questões de pesquisa

Questão de pesquisa	Síntese da resposta
Questão principal: Como um pipeline de prospecção apoiado por Inteligência Artificial Generativa pode apoiar o processo de descoberta e qualificação de clientes ideais no contexto do desenvolvimento de websites, contribuindo para decisões estratégicas de design e para a aplicação de práticas de Sucesso do Cliente?	Os resultados indicam que o pipeline desenvolvido demonstrou potencial para apoiar o processo de descoberta e qualificação de clientes, estruturando a coleta de informações, organizando requisitos e fornecendo suporte à tomada de decisão durante as etapas iniciais da prospecção comercial.
RQ1. Como a IA generativa pode automatizar o processo de descoberta do cliente, identificando se há aderência entre as necessidades do lead e a proposta da empresa de desenvolvimento web?	O pipeline automatizou parte da etapa de Customer Discovery por meio de agentes conversacionais capazes de conduzir entrevistas estruturadas, identificar necessidades e reunir informações relevantes para apoiar a análise da aderência entre o perfil do cliente e os serviços oferecidos.

RQ2. De que maneira a IA generativa pode interpretar descrições genéricas de problemas, extraindo informações relevantes para qualificar o cliente e entender seu contexto de negócio?	Os agentes conversacionais demonstraram capacidade de interpretar descrições fornecidas pelos participantes, organizar informações sobre objetivos, desafios e contexto de negócio, produzindo dados úteis para a qualificação inicial dos leads.
RQ3. Como a IA generativa pode otimizar entrevistas automatizadas, conduzindo à coleta de requisitos de forma personalizada, clara e eficaz?	A condução estruturada das entrevistas favoreceu a identificação de necessidades, a organização das informações e a reflexão dos participantes sobre seus próprios requisitos, reduzindo ambiguidades durante o levantamento inicial.
RQ4. Qual o impacto do uso da IA generativa no tempo de resposta, na percepção de valor e na satisfação do cliente durante o processo de prospecção?	Os participantes relataram percepção positiva quanto à utilidade do pipeline, destacando sua contribuição para compreender melhor as necessidades do projeto, estruturar informações e tornar a interação inicial mais organizada e eficiente.
RQ5. De que forma o pipeline proposto contribui para a aplicação de métricas de Sucesso do Cliente e para o aumento da conversão de leads em clientes efetivos?	O pipeline integra princípios de Customer Discovery, Lead Scoring e Customer Success para apoiar a qualificação de leads e o encaminhamento dos clientes para fluxos de atendimento compatíveis com seu perfil. Embora o potencial de contribuição para a conversão tenha sido identificado, sua mensuração em contextos comerciais reais permanece como oportunidade para pesquisas futuras.

Fonte: Elaborado pela autora (2026).

2.4 Limitações do estudo

Embora os resultados obtidos indiquem contribuições relevantes do artefato para atividades de Descoberta do Cliente e qualificação de leads, algumas limitações devem ser consideradas na interpretação dos resultados.

A primeira limitação está relacionada ao perfil dos participantes envolvidos na avaliação. O estudo foi conduzido com estudantes de pós-graduação da área de Computação, em um contexto acadêmico controlado. Embora os participantes tenham sido capazes de interagir com o sistema e fornecer percepções relevantes sobre sua utilização, o comportamento observado pode diferir daquele encontrado em situações reais de prospecção comercial envolvendo clientes externos e demandas reais de contratação de serviços de desenvolvimento de websites.

Outra limitação refere-se ao tamanho da amostra utilizada na avaliação. Embora os resultados obtidos sejam adequados para uma avaliação exploratória de

uma prova de conceito desenvolvida sob a abordagem de Design Science Research, eles não permitem generalizações estatísticas sobre a eficácia da solução em diferentes contextos de aplicação. Estudos futuros com amostras maiores e perfis mais diversos poderão fornecer evidências adicionais sobre a utilidade e a aplicabilidade do artefato.

Também foram identificadas limitações técnicas relacionadas à implementação da prova de conceito. Alguns participantes relataram dificuldades durante a transição entre agentes, interrupções no fluxo de interação, problemas de carregamento e falhas na entrega ou visualização da proposta gerada. Embora essas ocorrências não tenham impedido a avaliação do artefato, elas demonstram a necessidade de aprimoramentos na arquitetura da solução e na integração entre seus componentes.

Os resultados qualitativos também evidenciaram limitações relacionadas à personalização das propostas visuais geradas. Em alguns casos, os participantes observaram que aspectos importantes da identidade visual, posicionamento da marca e contexto específico do negócio não foram adequadamente refletidos na proposta apresentada pelo sistema. Além disso, foram relatadas situações em que a solução gerada não apresentava aderência completa às informações fornecidas durante as etapas anteriores da interação. Esses resultados sugerem a necessidade de mecanismos mais robustos de preservação de contexto e de personalização dos artefatos produzidos pela Inteligência Artificial.

Por fim, a implementação realizada nesta pesquisa teve como objetivo validar a viabilidade técnica e conceitual do artefato proposto, não contemplando funcionalidades normalmente presentes em sistemas comerciais de prospecção e relacionamento com clientes, como integração nativa com plataformas de CRM, mecanismos avançados de acompanhamento de métricas de Customer Success e processos automatizados de acompanhamento pós-venda. Dessa forma, os resultados devem ser interpretados como evidências iniciais sobre o potencial da abordagem proposta, servindo como base para futuras evoluções e investigações.

3. Conclusão

3.1 Síntese da contribuição prática

Esta pesquisa teve como objetivo investigar como a Inteligência Artificial Generativa pode apoiar o processo de descoberta e qualificação de clientes no contexto do desenvolvimento de websites. Para isso, foi desenvolvido um pipeline de prospecção apoiado por Inteligência Artificial Generativa, composto por agentes conversacionais, estruturado a partir dos princípios de Customer Discovery, Lead Scoring e Customer Success.

Como principal resultado prático, foi proposto e implementado um artefato capaz de conduzir entrevistas estruturadas com potenciais clientes, identificar necessidades, apoiar a qualificação de leads e gerar artefatos intermediários que auxiliam a compreensão do contexto e das oportunidades de negócio. A solução foi implementada como uma prova de conceito utilizando agentes conversacionais, serviços de IA generativa e mecanismos de integração por meio de plataformas iPaaS.

Os resultados obtidos durante a avaliação indicaram que os participantes perceberam valor especialmente nas atividades relacionadas à identificação de necessidades, compreensão dos requisitos do projeto e organização das informações coletadas durante o processo de prospecção. Esses resultados sugerem que a abordagem proposta possui potencial para apoiar profissionais e pequenas empresas de desenvolvimento web na condução de processos mais estruturados de descoberta e qualificação de clientes.

3.2 Contribuição teórica

Do ponto de vista acadêmico, esta pesquisa contribui para a discussão sobre a aplicação da Inteligência Artificial Generativa em etapas iniciais do relacionamento entre empresas e clientes. Enquanto grande parte da literatura concentra-se na utilização da IA para atividades de design, desenvolvimento e personalização de interfaces, esta dissertação investigou sua aplicação em atividades de descoberta do cliente e qualificação de leads, uma área ainda pouco explorada nos estudos identificados na Revisão Sistemática da Literatura.

A pesquisa também contribui ao integrar conceitos provenientes de diferentes áreas do conhecimento, incluindo Customer Discovery, Customer Success, Lead Scoring, Inteligência Artificial Generativa e Design Science Research. Como resultado, foi proposto um pipeline que demonstra como agentes conversacionais podem atuar como mecanismos de apoio à coleta, organização e interpretação de informações durante as etapas iniciais de prospecção.

Os resultados obtidos sugerem que a utilização de agentes de IA pode contribuir para reduzir ambiguidades, apoiar a identificação de necessidades e fornecer suporte à tomada de decisão em processos de prospecção, ampliando as possibilidades de aplicação da Inteligência Artificial Generativa em contextos de relacionamento com clientes.

3.3 Trabalhos futuros

Como continuidade desta pesquisa, recomenda-se a realização de estudos envolvendo clientes reais em contextos comerciais, permitindo avaliar o comportamento do artefato em situações de prospecção efetiva e mensurar seu impacto em indicadores relacionados à conversão de leads, eficiência operacional e satisfação dos clientes.

Também são oportunidades para trabalhos futuros o aprimoramento dos mecanismos de geração de propostas visuais, a incorporação de informações relacionadas à identidade visual e posicionamento das marcas avaliadas, bem como o desenvolvimento de interfaces mais interativas para coleta de informações durante as entrevistas conduzidas pelos agentes.

Outra possibilidade consiste na integração do pipeline com plataformas de CRM e ferramentas utilizadas em processos de Customer Success, permitindo acompanhar a evolução dos clientes após a etapa de prospecção e investigar os efeitos da abordagem proposta ao longo de todo o ciclo de relacionamento.

Por fim, futuras pesquisas podem avaliar a aplicação do pipeline proposto em outros domínios além do desenvolvimento de websites, incluindo contextos como educação, saúde, consultoria e serviços especializados, nos quais processos de descoberta, qualificação e compreensão das necessidades dos usuários também desempenham papel fundamental.

Nota sobre a elaboração das figuras

As figuras e ilustrações conceituais elaboradas especificamente para esta dissertação foram produzidas pela autora com apoio de ferramentas de Inteligência Artificial Generativa para fins de composição visual. A definição do conteúdo técnico, da arquitetura proposta, da organização dos elementos, da validação das informações e da revisão final permaneceu sob responsabilidade da autora. As ferramentas de IA foram utilizadas exclusivamente como apoio gráfico, não sendo empregadas na geração dos resultados científicos, das análises ou das conclusões desta pesquisa.

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APÊNDICE A

Artigo aceito na IISA 2026

*Artificial Intelligence in Graphic Design for Web Development:
A Systematic Literature Review Focused on Customer Success*

Artificial Intelligence in Graphic Design for Web Development: A Systematic Literature Review Focused on Customer Success

Ana Carolina Malveira Ferreira
IESTI, Universidade Federal de Itajubá (UNIFEI)
Itajubá, Brazil
anacarolina@unifei.edu.br

Adler Diniz de Souza
IMC, Universidade Federal de Itajubá (UNIFEI)
Itajubá, Brazil
adlerdiniz@unifei.edu.br

Abstract—This study presents a systematic literature review investigating the application of artificial intelligence in graphic design for web development, with a particular focus on customer success. The review draws from peer-reviewed studies indexed in repositories such as Scopus and ScienceDirect to identify how generative AI technologies contribute to user satisfaction, experience, and engagement. The findings demonstrate that AI significantly improves design efficiency, fosters creativity, and accelerates ideation processes [1], [2]. However, the adoption of AI tools is hindered by several challenges, including biases in AI models, usability limitations, and complexities in integration with existing workflows [3], [4]. These barriers highlight the need for transparent and user-friendly AI systems capable of addressing these limitations. Despite these obstacles, the transformative potential of AI in graphic design is evident, particularly in enabling innovative solutions and streamlining design processes. This review underscores the importance of advancing research to overcome current challenges, improve usability, and ensure ethical AI practices. By addressing these gaps, future studies can pave the way for broader adoption of AI technologies in graphic design for web development, ultimately advancing customer success and fostering innovation in this evolving field.

Index Terms—Artificial Intelligence, Generative AI, Graphic Design, Web Development, Customer Success, User Experience

I. INTRODUCTION

The integration of artificial intelligence (AI) into graphic design for web development has accelerated significantly in recent years, driven by advancements in machine learning and generative technologies. These innovations offer transformative solutions that enhance creativity, streamline workflows, and improve user experiences. Generative AI tools, such as those leveraging machine learning algorithms and generative adversarial networks (GANs), are increasingly utilized to automate repetitive tasks, generate intelligent design recommendations, and create dynamic, personalized user interfaces. This evolution is reshaping traditional design practices, aligning them with the complex and rapidly evolving demands of modern web development.

While the potential benefits of AI in graphic design are considerable, their implementation is not without challenges. Issues such as biases inherent in AI models, the complexities of integration into existing workflows, and the need for skilled

professionals to manage and interpret AI outputs present significant barriers. Moreover, ensuring that AI-driven designs meet the highest standards of usability and deliver measurable customer satisfaction remains a pressing concern, particularly in the context of web development projects oriented toward user success.

This paper aims to address these opportunities and challenges through a systematic literature review, providing a comprehensive exploration of the state-of-the-art in the application of AI to graphic design for web development from a customer success perspective. The study focuses on understanding how AI technologies are currently utilized, their impact on user satisfaction and experience, and the challenges hindering their broader adoption.

The remainder of this paper is structured as follows: Section II outlines the research methodology employed to identify and analyze relevant literature. Section III presents the primary findings, detailing the technologies, benefits, and limitations of AI in this domain. Section IV addresses the research questions, offering critical insights into the implications of the findings. Finally, Section V summarizes the study's contributions and suggests future research directions to further advance the integration of AI in graphic design for web development.

II. RESEARCH METHODOLOGY

This systematic literature review (SLR) investigates the state-of-the-art in the application of artificial intelligence (AI) in graphic design for web development, with a particular focus on its impact on customer success. The methodology adopted in this study follows the guidelines proposed by Kitchenham and Charters [5], which provide a structured and replicable approach for conducting systematic literature reviews in software engineering. Additionally, methodological principles from Wohlin [6] are incorporated to enhance rigor in study selection and data synthesis.

The objective of this SLR is to identify, analyze, and synthesize peer-reviewed research that explores the use, benefits, and challenges of AI technologies in graphic design for web development. The study aims to answer predefined research questions (RQs) regarding the application of generative AI, its

effects on user experience and satisfaction, and the obstacles to its broader adoption.

The review process followed a well-defined protocol consisting of the following key steps:

- **Definition of the research protocol:** Establishing a structured and transparent plan to ensure consistency in the review process.
- **Definition of inclusion and exclusion criteria:** Selecting relevant studies based on predefined eligibility criteria.
- **Search and selection of studies:** Conducting a comprehensive search in multiple databases (Scopus and ScienceDirect) and applying filtering techniques.
- **Quality assessment:** Evaluating the methodological rigor of the selected studies using a predefined checklist.
- **Data extraction and synthesis:** Collecting and analyzing key findings to answer the research questions.

Each of these steps is detailed in the following subsections.

A. DEFINITION OF PICOC

PICOC stands for Population, Intervention, Comparison, Outcome and Context of the Systematic Literature Review which was defined as shown in the Table I:

TABLE I
PICOC DEFINITION

Section	Definition
Population	Studies on the application of artificial intelligence (AI) in graphic design for web development and front-end web development.
Intervention	Use of generative AI technologies in graphic design.
Comparison	Traditional graphic design methods.
Outcome	Enhanced customer success, improved user experience, and increased user satisfaction.
Context	Web development, front-end web development environments

B. DEFINITION OF RESEARCH QUESTIONS

The first step of a systematic literature review is the definition of the research questions. Defining these questions ensures the selection of articles aligns with the review objectives. Based on the state-of-the-art in the use of AI in graphic design for web development, the following research questions were elaborated:

- 1) RQ1: How is artificial intelligence being utilized in graphic design for web development and front-end web development to enhance customer success?
- 2) RQ2: What are the benefits of integrating generative AI technologies into graphic design processes for web development in terms of user experience and satisfaction?
- 3) RQ3: What challenges are associated with the use of AI in graphic design for web development and front-end development, and how can they be addressed?

C. SEARCH STRATEGY AND DATA COLLECTION

This study follows the systematic review methodology proposed by Kitchenham and Charters [5], which is widely recognized in software engineering for ensuring rigor and replicability in literature reviews. The search was performed in multiple digital libraries, including Scopus and ScienceDirect, to ensure broader coverage of relevant studies. The search process was initially conducted in August 2024 and subsequently updated prior to the final analysis. The final set of studies reflects the publications available in the selected databases at the time of the final analysis. Although these databases provide broad coverage of the relevant literature, studies indexed exclusively in other repositories may not have been captured.

To maximize the retrieval of relevant publications, we constructed a Boolean search query using combinations of key terms related to artificial intelligence, generative AI, web design, and customer success. The following query was applied:

("Generative AI" OR "Machine Learning") AND ("Web Design" OR "Front-End Development") AND ("Customer Success" OR "User Experience" OR "User Satisfaction")

As the search was conducted across multiple databases, duplicate removal procedures were applied when necessary. Additionally, no date restriction was applied, except for an implicit focus on recent research, as only studies from the last ten years were included, unless they provided foundational theoretical knowledge.

The initial search returned **78 articles**, which were then filtered based on predefined inclusion and exclusion criteria shown in Table II and Table III respectively. After applying these criteria, 21 articles were selected for full-text reading and quality assessment, all of which were retained for in-depth analysis, as they met all relevance and methodological rigor requirements.

TABLE II
SET OF INCLUSION CRITERIA

Criteria	Description
IC-01	Publications in English.
IC-02	Peer-reviewed journal articles, conference papers, and academic book chapters.
IC-03	Studies addressing generative AI in graphic design or web development.
IC-04	Studies focusing on customer success, user experience, or design effectiveness.

D. QUALITY ASSESSMENT

To ensure the reliability and validity of the selected studies, a quality assessment checklist was applied. The checklist evaluates key aspects of each study to determine its relevance and methodological rigor. The following seven questions were used as the basis for the quality assessment:

TABLE III
SET OF EXCLUSION CRITERIA

Criteria	Description
EC-01	Non-peer-reviewed publications such as blogs or opinion articles.
EC-02	Studies unrelated to AI or graphic design for web development.
EC-03	Articles published more than 10 years ago, except for foundational knowledge.

- 1) Does the study address potential biases and limitations?
- 2) Is the study relevant to the objectives of the systematic review?
- 3) Is the study design appropriate for the research question?
- 4) Are the sampling methods clearly described and appropriate?
- 5) Are the data collection methods clearly described and valid?
- 6) Is the data analysis method clearly described and appropriate for the study?
- 7) Are the results reported clearly and in detail?

Each study was scored on a scale of 0 to 2 for each question, where:

- **0:** No.
- **1:** Partially.
- **2:** Yes.

The total score for each study was calculated by summing the individual scores. Studies scoring less than 10 out of a maximum of 14 points were excluded from further analysis. This quality assessment process ensured that only studies with sufficient rigor and relevance were included in the final synthesis. A total of 21 articles met the inclusion criteria and were considered for analysis, as shown in Figure 1.

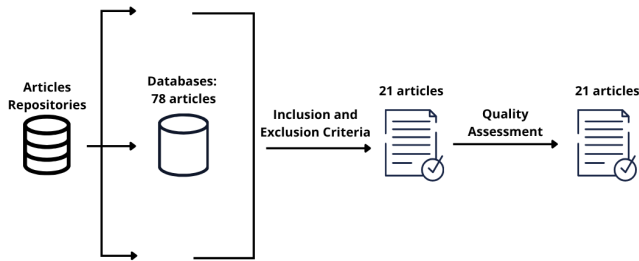


Fig. 1. Search methodology used for systematic mapping. After applying the inclusion and exclusion criteria, along with the quality assessment, 21 works remained for analysis by the authors.

E. DATA EXTRACTION

After selecting the articles that compose this systematic literature review, a data extraction process was carried out to answer the research questions previously defined. The main information extracted from each study included:

- Title of the study

TABLE IV
QUALITY ASSESSMENT SCORES OF SELECTED ARTICLES

Author	QA1	QA2	QA3	QA4	QA5	QA6	QA7	Total
[7]	2	2	2	2	2	2	2	14
[8]	2	2	2	1	2	2	1	12
[9]	2	2	2	1	2	2	1	12
[10]	2	2	2	2	2	2	2	14
[11]	2	2	2	1	2	2	1	12
[12]	2	2	2	1	2	2	1	12
[13]	2	2	2	1	2	2	1	12
[14]	2	2	2	1	2	2	1	12
[15]	2	2	2	0	2	2	1	11
[1]	2	2	2	2	2	2	2	14
[16]	2	2	2	1	2	2	1	12
[3]	2	2	2	2	2	2	2	14
[2]	2	2	2	2	2	2	2	14
[17]	2	2	2	2	2	2	2	14
[18]	2	2	2	2	2	2	1	13
[19]	2	2	2	2	2	2	1	13
[20]	2	2	2	1	2	2	2	13
[21]	2	2	2	2	2	2	2	14
[4]	1	2	2	2	2	2	2	13
[22]	2	1	2	2	2	2	2	13
[23]	2	2	2	2	2	2	2	14

- Authors
- Year of publication
- Source
- Objective of the study
- Research questions or hypotheses
- Study design
- Sample (size, participant characteristics)
- Data collection methods
- Data analysis methods
- Main findings
- Quantitative data
- Qualitative data
- Authors' conclusions
- Implications for practice or theory
- Bias assessment
- Study limitations
- AI technologies used

- Measures of customer success and user satisfaction

The extracted information was synthesized to address the research questions and provide a comprehensive overview of the application of artificial intelligence in graphic design for web development. The titles of the selected articles, along with their year of publication, are presented in Table V.

The inclusion of additional studies expanded the coverage of recent developments in generative AI applications in web design, reinforcing the robustness of the findings.

III. RESULTS

This section provides a synthesis of the findings from the selected studies (n = 21), addressing the objectives of this systematic literature review. The review focuses on the use of Artificial Intelligence (AI) in graphic design for web development, emphasizing its impact on customer success through improved user experience and satisfaction. The findings are organized according to the themes and challenges identified in the reviewed studies.

A. Summary of findings

The integration of AI in web development and graphic design has shown significant potential to enhance user experience by enabling dynamic personalization and automation. For instance, WASILEWSKI *et al.* (2024) [14] demonstrated the advantages of multivariant personalization in e-commerce user interfaces, highlighting its role in improving customer engagement and satisfaction. However, challenges such as limited adaptability in current interfaces and barriers to the adoption of AI technologies remain prevalent.

NAMOUN *et al.* (2024) [15] explored the application of AI-driven predictive models for identifying usability issues in mobile applications. These models enable early detection of usability challenges, facilitating iterative improvements to interface design. Despite these advancements, the study emphasized the difficulty of integrating contextual understanding into AI systems, which remains a critical limitation.

The collaboration between human designers and AI tools was investigated by GMEINER *et al.* (2023) [2], who identified both opportunities and challenges in co-creative design processes. While AI technologies support ideation and accelerate the design process, designers often encounter difficulties in interpreting and controlling AI-generated outputs, underlining the need for greater transparency and usability in AI tools.

ZHONG *et al.* (2024) [17] proposed the use of AI-assisted causal diagrams to enhance decision-making in human-centered design. This approach enables designers to visualize cause-and-effect relationships within design processes, improving alignment with user needs. However, the study noted the lack of user-friendly tools as a significant barrier to broader adoption.

Generative AI technologies have been particularly effective in supporting ideation within graphic design. CHOI *et al.* (2024) [1] demonstrated how these tools enable the recombination of visual references, accelerating the creative process.

Nonetheless, **balancing automation with human creativity** remains a persistent challenge.

In the context of collaborative design, XU *et al.* (2024) [16] introduced an AI-augmented framework leveraging Large Language Models (LLMs) within mixed reality environments. This framework enhances communication among multidisciplinary teams, facilitating more effective collaboration. However, real-time integration of AI-generated content in mixed reality environments remains complex.

The usability and emotional impact of AI-generated design tools were examined by CASTELEIRO-PITREZ (2024) [3]. The findings revealed that while tools such as Midjourney and Adobe Firefly improve design efficiency, they often fail to provide sufficient creative control, limiting their acceptance among designers.

The paradigm of nonlinear collaboration between humans and AI was explored by ZHOU *et al.* (2024) [18]. The study emphasized treating **AI as an active collaborator** rather than a passive tool, **enabling iterative creativity**. This approach fosters exploration and innovation but requires AI systems to better align with human workflows and intentions.

In summary, the findings from the reviewed articles demonstrate the transformative potential of AI in enhancing user experience and satisfaction in graphic design and web development. However, several challenges remain, including **issues related to transparency, usability, real-time integration, and the alignment of AI systems with human creativity**. These findings provide a comprehensive overview of the current state of the art and highlight opportunities for future research in this evolving field.

B. Challenges

The integration of Artificial Intelligence (AI) in graphic design for web development has introduced several challenges that need to be addressed for effective implementation. The reviewed studies highlight key difficulties encountered in various aspects of AI-driven design.

A primary challenge is the **lack of AI transparency and explainability**, which hinders designers from fully understanding and trusting AI-generated suggestions. GMEINER *et al.* (2023) [2] found that designers struggle with interpreting AI-driven outputs, necessitating more intuitive and user-friendly AI systems. Similarly, NAMOUN *et al.* (2024) [15] noted that AI models predicting usability issues in mobile applications often fail to incorporate contextual human interactions, reducing their effectiveness.

Another major issue is the need for user-friendly AI-assisted tools. ZHONG *et al.* (2024) [17] proposed an AI-assisted causal pathway diagram to aid human-centered design, yet they highlighted the necessity for more accessible tools that do not increase designers' cognitive workload. Likewise, CASTELEIRO-PITREZ (2024) [3] pointed out that AI-generated image tools, while efficient, often limit user control, thereby restricting creative flexibility.

The balance between automation and human creative control remains an ongoing challenge. CHOI *et al.* (2024)

TABLE V
SELECTED ARTICLES THROUGH SYSTEMATIC LITERATURE REVIEW

REF.	Title	Year
[7]	<i>Artificial intelligence in web accessibility: A systematic mapping study</i>	2026
[8]	<i>StarryStudioAI: Automating UI Design with Code-Based Generative AI and RAG</i>	2025
[9]	<i>Using Generative AI to Support UX Design Students in Web Development Courses</i>	2025
[10]	<i>Towards accessible website design through artificial intelligence: A systematic literature review</i>	2025
[11]	<i>Democratizing interactivity: An overview of interfaces for multimedia machine learning</i>	2025
[12]	<i>Enhancing User Experience with AI-Generated CSS Through Machine Learning for Adaptive Web Design</i>	2024
[13]	<i>AI-Driven System for Real-Time Transformation of Web Applications into Mobile-Friendly Versions</i>	2024
[24]	<i>Integrating AIGC into product design ideation teaching: An empirical study on self- efficacy and learning outcomes</i>	2024
[3]	<i>Generative Artificial Intelligence Image Tools among Future Designers: A Usability, User Experience, and Emotional Analysis</i>	2024
[16]	<i>LLM enabled generative collaborative design in a mixed reality environment</i>	2024
[17]	<i>AI-Assisted Causal Pathway Diagram for Human-Centered Design</i>	2024
[18]	<i>Understanding Nonlinear Collaboration between Human and AI Agents: A Co-design Framework for Creative Design</i>	2024
[1]	<i>CreativeConnect: Supporting Reference Recombination for Graphic Design Ideation with Generative AI</i>	2024
[15]	<i>Predicting the usability of mobile applications using AI tools: The rise of large user interface models, opportunities, and challenges</i>	2024
[22]	<i>Embracing integrated tech in graphic communications: Industry 5.0 perspectives</i>	2023
[14]	<i>One Size Does Not Fit All: Multivariant User Interface Personalization in E-Commerce</i>	2024
[4]	<i>A Study on Factors Influencing Designers' Behavioral Intention in Using AI-Generated Content for Assisted Design: Perceived Anxiety, Perceived Risk, and UTAUT</i>	2024
[20]	<i>Evaluating ChatGPT: Generative AI in UX Design and Web Development Pedagogy</i>	2024
[19]	<i>Machine Learning (ML) diffusion in the design process: A study of Norwegian design consultancies</i>	2023
[2]	<i>Exploring Challenges and Opportunities to Support Designers in Learning to Co-create with AI-based Manufacturing Design Tools</i>	2023
[23]	<i>Factors Influencing the Adoption of Generative AI for Art Designing Among Chinese Generation Z: A Structural Equation Modeling Approach</i>	2023

[1] investigated generative AI tools for ideation and emphasized the difficulty of integrating AI-generated content without undermining human creativity. This issue is further compounded in collaborative design environments, where XU *et al.* (2024) [16] found that the integration of Large Language Models (LLMs) in mixed reality design improved communication but introduced complexities in real-time AI content adaptation.

Usability and user experience (UX) gaps also persist. LI *et al.* (2024) [4] analyzed the adoption of generative AI among Generation Z designers and discovered that many users experience barriers due to lack of training and the perceived complexity of AI-driven tools. Additionally, TROČIN *et al.* (2023) [19] reported that machine learning diffusion in the design process faces resistance due to designers' lack of trust in AI-generated outputs.

Furthermore, AI's role in nonlinear human-AI collaboration presents new difficulties. ZHOU *et al.* (2024) [18] introduced a **co-design framework that shifts AI from a tool to an active collaborator**. However, their study highlighted challenges in aligning AI interactions with human design workflows.

Finally, ethical and operational concerns arise in AI-driven graphic design. Takafoli *et al.* (2024) [21] explored AI as a creativity partner, noting concerns over biases in AI-generated content and intellectual property rights.

Overall, these challenges indicate that while AI significantly enhances efficiency and ideation in graphic design for web development, further advancements are required in AI transparency, user-friendly interfaces, human-AI collaboration models, and ethical considerations to fully harness its potential.

IV. DISCUSSION

The results presented in Section III provide insights into the state-of-the-art applications of artificial intelligence (AI) in graphic design for web development. The discussion below analyzes these findings in relation to the research questions, highlighting both the advantages and challenges of AI integration in this domain.

RQ1: How is artificial intelligence being utilized in graphic design for web development and front-end web development to enhance customer success?

Artificial intelligence has been increasingly incorporated into graphic design for web development, primarily through generative AI models, machine learning algorithms, and automation tools. These technologies facilitate design personalization, user interface (UI) adaptation, and the automation of repetitive tasks, ultimately enhancing efficiency and creativity. Several studies highlight the role of AI in automating layout generation, suggesting design improvements, and optimizing

TABLE VI
OBJECTIVES, SAMPLE, AND STUDY DESIGN OF THE SELECTED ARTICLES

N°	REF.	Objectives	Sample (size, participants characteristics)	Study Design	Challenges Identified
1	[14]	To explore how multivariant UI personalization enhances user satisfaction in e-commerce.	Not reported; e-commerce user data assumed.	Case study of e-commerce personalization systems.	Current UIs lack personalization; AI adoption
2	[15]	To predict mobile app usability using AI models and improve user interaction analysis.	Not reported; mobile app user interaction data assumed.	Exploratory study using AI predictive models for mobile app usability.	Contextual understanding of human interactions remains a challenge.
3	[2]	To investigate challenges and opportunities in designers' co-creation with AI tools.	Designers from manufacturing design teams; sample size unspecified.	Qualitative study of designers' experiences with AI-based co-creation tools.	Transparency and explainability of AI-generated design suggestions.
4	[17]	To propose AI-assisted causal diagrams for structured, human-centered design processes.	Human-centered design professionals; sample size unspecified.	Framework proposal and validation through qualitative analysis.	Need for user-friendly AI-assisted diagram tools.
5	[1]	To study the role of generative AI in accelerating ideation in graphic design.	Graphic designers involved in ideation processes; sample size unspecified.	Exploratory research on AI's role in idea generation for graphic design.	Balancing automation with human creative control.
6	[16]	To develop an AI-augmented framework for collaborative design in mixed reality.	Stakeholders in mixed reality collaborative design; sample size unspecified.	Framework proposal with case studies in mixed reality collaborative design.	Integration of AI-generated content in real-time mixed reality environments.
7	[3]	To evaluate the usability, UX, and emotional responses to AI-generated image tools.	60 multimedia design students (Bachelor's level) from Portugal.	Quantitative study using usability questionnaires (USEQ, UEQ, PANAS).	Usability and UX gaps in AI-generated design
8	[18]	To propose a nonlinear framework for human-AI collaboration in creative design.	12 design experts (3–5 years of experience); tested in creative co-design tasks.	Comparative study using a proof-of-concept prototype vs. baseline tool.	Aligning AI with human design processes and iterative creativity.

TABLE VII
MAIN AI TECHNOLOGY, FOCUS AREA AND KEY FINDINGS OF THE SELECTED ARTICLES

N	REF.	Main AI Technology	Focus Area	Key findings
01	[14]	Machine Learning, UI Adaptation	AI-driven UI personalization	Personalized UI improves customer engagement and satisfaction
02	[15]	AI-driven predictive modeling	AI predicting mobile app usability	AI predicts usability issues but struggles with contextual human interaction
03	[2]	Generative AI, Learning-based interaction	AI-assisted co-creation in design	Designers face challenges in understanding AI suggestions; need for transparent AI interactions
04	[17]	AI-driven diagram generation	AI-generated causal pathway diagrams	AI-assisted causal diagrams improve strategy and decision-making in design
05	[1]	Generative AI for ideation	AI-powered ideation in graphic design	AI enables rapid reference recombination, aiding ideation in graphic design
06	[16]	Large Language Models (LLMs), Mixed Reality	AI in collaborative mixed reality design	LLMs improve communication in multidisciplinary design teams
07	[3]	AI-generated image tools (Midjourney, Adobe Firefly)	User experience evaluation of AI tools	AI image tools are easy to use but lack full creative control
08	[18]	Human-AI co-creation framework	Nonlinear AI-human collaboration in creative design	Treating AI as a collaborative entity fosters more creative exploration

front-end development workflows (Wasilewski and Kolaczek, 2024; Choi *et al.*, 2024) [14] [1].

One of the most prominent applications of AI in this field is multivariant user interface personalization, which dynamically adjusts interface elements based on user preferences and behaviors (Wasilewski and Kolaczek, 2024) [14]. AI-driven predictive modeling has also been employed to assess

usability and optimize interface components in mobile and web applications (Namoun *et al.*, 2024) [15]. Additionally, generative AI tools support ideation by allowing designers to explore a broader range of design possibilities while maintaining consistency with branding guidelines (Choi *et al.*, 2024) [1].

Beyond direct design applications, large language models

(LLMs) and AI-assisted frameworks have been integrated into collaborative design environments, particularly in mixed reality and co-design scenarios (Xu *et al.*, 2024) [16]. These AI-powered solutions enhance real-time communication between multidisciplinary teams, enabling more efficient and data-driven design processes.

RQ2: What are the benefits of integrating generative AI technologies into graphic design processes for web development in terms of user experience and satisfaction?

The integration of AI into graphic design and web development significantly enhances user experience, engagement, and satisfaction by improving design efficiency, interface adaptability, and personalization. One of the primary advantages of AI-driven systems is their ability to streamline design workflows, allowing designers **to focus on higher-level creative decisions rather than repetitive tasks** (Gmeiner *et al.*, 2023) [2].

AI-powered usability testing and predictive modeling contribute to more intuitive and user-centered designs by analyzing interaction patterns and identifying potential usability issues before deployment (Namoun *et al.*, 2024) [15]. Similarly, AI-assisted causal pathway diagrams have been proposed to aid in structured decision-making, improving the overall quality of the user experience (Zhong *et al.*, 2024) [17].

Another key benefit is the enhancement of creative ideation through generative AI models. These models support designers by automating the recombination of visual references and generating adaptive UI elements, leading to more dynamic and engaging web designs (Choi *et al.*, 2024) [1]. Additionally, AI-powered image generation tools such as Midjourney and Adobe Firefly have been found to improve design efficiency, although they still present limitations in terms of creative control (Casteleiro-Pitrez, 2024) [3].

The integration of AI in front-end development further improves user satisfaction by enabling real-time customization of interfaces based on user interactions. Multivariant personalization techniques have demonstrated significant potential in increasing engagement in e-commerce platforms by tailoring UI elements to user preferences (Wasilewski and Kolaczek, 2024) [14].

RQ3: What challenges are associated with the use of AI in graphic design for web development and front-end development, and how can they be addressed?

Despite its transformative potential, the adoption of AI in graphic design and web development faces several challenges related to transparency, usability, and ethical considerations. One of the primary limitations is the lack of explainability in AI-generated outputs, which hinders designers from fully understanding or refining AI-assisted suggestions (Gmeiner *et al.*, 2023) [2]. Many designers struggle with the interpretability of AI-driven decisions, **leading to a reliance on human intervention to validate** and adjust results.

Another key issue is the **balance between automation and creative control**. While AI tools significantly improve efficiency, designers often experience limited flexibility in modifying AI-generated content to align with specific creative

visions (Casteleiro-Pitrez, 2024) [3]. This is particularly evident in AI-powered image generation and UI adaptation, where designers may need more granular **control over AI-generated elements to maintain originality and brand identity** (Choi *et al.*, 2024) [1].

Usability gaps persist, particularly in mixed reality and real-time collaborative design environments. Studies have shown that while large language models (LLMs) and AI-augmented frameworks enhance team collaboration, their integration into design workflows remains complex (Xu *et al.*, 2024) [16]. Ensuring seamless AI-driven interactions in collaborative settings requires further refinement of real-time adaptation mechanisms.

Ethical concerns, including bias in AI-generated content and intellectual property rights, pose additional challenges to the widespread adoption of AI in design. Bias in AI models can lead to unintended discrimination in UI design, affecting accessibility and inclusivity (Takafoli *et al.*, 2024) [21]. Additionally, the ownership of AI-generated designs remains a legal and ethical gray area, requiring clearer guidelines to ensure fair use and attribution (Takafoli *et al.*, 2024) [21].

To address these challenges, future research should focus on enhancing AI transparency through **explainable AI (XAI) techniques**, enabling designers to better understand and refine AI-generated outputs. Increasing customization options within AI-driven design tools would also help balance automation with creative control. Moreover, the development of standardized ethical frameworks for AI in graphic design is essential to mitigate bias and safeguard intellectual property rights (Takafoli *et al.*, 2024) [21].

V. CONCLUSION

The integration of Artificial Intelligence (AI) in graphic design for web development represents a pivotal advancement, offering unprecedented potential to enhance usability performance and customer success. This systematic review synthesized findings from 21 key studies, uncovering the significant benefits of AI applications, such as **automating repetitive design tasks, enhancing ideation through generative AI, and optimizing usability and user interfaces**. These advancements underscore AI's transformative role in empowering designers to create user-centric and innovative web solutions.

A. Challenges and Opportunities

The integration of AI in graphic design for web development faces **challenges in transparency, usability, and human-AI collaboration** (GMEINER *et al.*, 2023; NAMOUN *et al.*, 2024) [2] [15]. Designers struggle with interpreting AI outputs, trust issues, and limited creative control (TROČIN *et al.*, 2023; CASTELEIRO-PITREZ, 2024) [19] [3]. Real-time AI adaptation in collaborative environments adds complexity (XU *et al.*, 2024) [16], while ethical concerns like bias and intellectual property persist (Takafoli *et al.*, 2024) [21]. Overcoming these barriers is essential to fully harness AI's potential in web development.

B. Future Directions

To address these challenges, future research should prioritize the development of explainable and user-centric AI tools that enhance transparency and empower designers to better control and refine outputs. Integrating AI training modules into design education can help overcome trust and usability issues by equipping designers with the skills needed to effectively use AI tools. Additionally, establishing ethical frameworks for AI in graphic design is critical to mitigate bias and safeguard intellectual property. Collaborative models that align human creativity with AI capabilities, such as nonlinear co-design frameworks, also present promising directions for improving design processes (ZHOU *et al.*, 2024) [18].

C. Final Remarks

This study highlights the duality of opportunities and challenges in AI adoption for graphic design in web development. While AI technologies revolutionize efficiency and creativity, addressing their limitations and ethical concerns is crucial for maximizing their impact. By fostering collaboration between human designers and intelligent systems, the industry can advance **toward a future where AI serves as a seamless and trustworthy partner in the creative process.**

VI. DECLARATION ON GENERATIVE AI

During the preparation of this work, the author(s) used ChatGPT and Grammarly in order to: Grammar and spelling check, Paraphrase and reword. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the publication's content.

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APÊNDICE B

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AI-Supported Client Discovery and Lead Qualification:

A Human-AI Decision Support Pipeline for Web Development

AI-Supported Client Discovery and Lead Qualification: A Human-AI Decision Support Pipeline for Web Development

Ana Carolina Malveira Ferreira
IESTI, Universidade Federal de Itajubá (UNIFEI)
Itajubá, Brazil
anacarolina@unifei.edu.br

Adler Diniz de Souza
IMC, Universidade Federal de Itajubá (UNIFEI)
Itajubá, Brazil
adlerdiniz@unifei.edu.br

Abstract—In web development, early-stage client discovery and lead qualification are critical yet often informal processes in small digital service studios. These stages are frequently rushed or overlooked, leading to misaligned expectations, inefficient resource allocation, and poor decision-making during client selection. While generative artificial intelligence (AI) has been increasingly adopted in design and development workflows, its role in supporting early-stage client interactions and decision-making remains underexplored.

This paper presents an AI-supported pipeline for client discovery and lead qualification, designed as a human-AI decision support system. The pipeline integrates conversational AI agents, lead scoring based on an Ideal Customer Profile (ICP), and automated orchestration through an integration platform as a service (iPaaS). It supports requirement elicitation and generates diagnostic artifacts, including AI-generated website mockups, to assist developers in evaluating potential clients.

Grounded in Design Science Research, a functional prototype was developed and evaluated through an exploratory pre-test with three specialists, using structured questionnaires with Likert-scale items and qualitative feedback to assess decision confidence, clarity of client requirements, and perceived effort. The evaluation examines how the pipeline influences decision confidence, clarity of client requirements, and perceived effort during early-stage interactions.

Preliminary results suggest that the pipeline promotes more structured and consistent qualification processes, improves clarity in requirement articulation, and supports more informed decision-making. The findings also highlight limitations related to initial information quality and interaction design, pointing to opportunities for improving human-AI collaboration in client-facing contexts.

Index Terms—Human-AI Interaction; Decision Support Systems; Client Discovery; Lead Qualification; Generative AI; Design Science Research; Customer Success

I. INTRODUCTION

Independent web designers in small studios are often responsible for the entire project lifecycle, including early-stage client interactions such as client discovery and lead qualification. In practice, these stages are frequently informal, rushed, or even skipped, leading to misaligned expectations, incomplete requirements, and inefficient allocation of professional effort. As a result, designers may engage with clients who are not well aligned with their expertise or business

goals, negatively impacting both project outcomes and long-term client relationships. From a Design Science Research (DSR) perspective, this study follows an iterative process of problem identification, artifact development, and evaluation, as illustrated in Figure 1.

These early interactions are not only operational challenges but also decision-making processes under uncertainty, requiring designers to interpret incomplete information, assess client fit, and define initial project directions [1]. Despite their importance, these decision processes remain largely unsupported by systematic tools, particularly in small-scale professional contexts [2].

Recent advances in generative AI have introduced new possibilities for supporting design activities, including ideation, content generation, and human-AI collaboration in creative workflows [3]–[7]. These approaches emphasize the role of AI as a collaborator in human-centered design processes, supporting designers in exploration, iteration, and decision-making [4], [6].

However, existing research has primarily focused on downstream stages of design, where requirements are already defined and clients are already engaged. Less attention has been given to how AI can support early-stage client interactions, particularly in processes involving ambiguity, negotiation, and decision-making.

This gap is especially relevant in contexts that involve client discovery [8] and lead qualification, where designers must evaluate potential clients based on incomplete and evolving information. In such scenarios, questions arise regarding how AI can support not only task execution but also cognitive processes such as understanding, evaluation, and decision confidence.

In response, this research investigates how an AI-supported pipeline for client discovery and lead qualification can support web designers in making more informed decisions during early-stage interactions, aligned with Customer Success practices. The study focuses on how this pipeline influences designers' decision-making processes during early-stage interactions, particularly in terms of perceived decision confidence, clarity of client requirements, and perceived effort, as captured

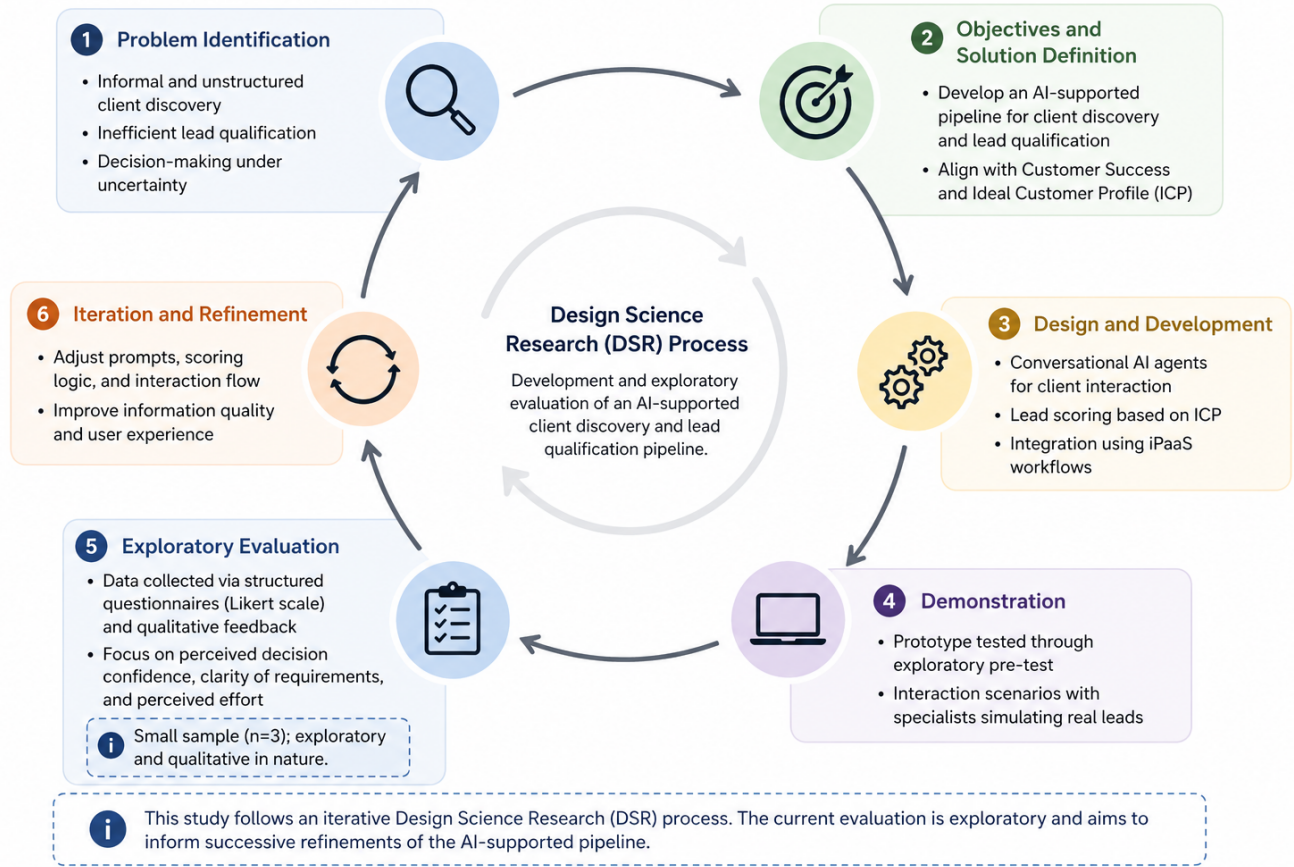


Fig. 1. Design Science Research (DSR) process applied in this study, illustrating the stages of problem identification, artifact development, exploratory evaluation, and iterative refinement.

through structured questionnaire responses and qualitative feedback.

Grounded in Design Science Research [2], this work contributes by (1) framing client discovery as a human-AI interaction problem, (2) proposing a pipeline that integrates conversational AI, lead scoring, and automated orchestration, and (3) reporting exploratory qualitative observations on how AI-supported client discovery and lead qualification may influence professional decision-making in early-stage client interactions.

II. RELATED WORK

A. AI in Graphic Design and Web Development

The integration of AI into graphic design and web development has significantly expanded in recent years, driven by advances in generative models, machine learning, and automation techniques. Prior research has demonstrated that AI can support a wide range of design activities, including ideation, layout generation, and user interface (UI) personalization. Generative AI tools enable designers to rapidly explore alternative design solutions by recombining visual references and generating adaptive interface components, thereby accelerating creative workflows and reducing repetitive tasks [3], [5].

In the context of web development, AI-driven approaches have also been applied to improve usability and user experience. Predictive models can identify potential usability issues early in the design process, enabling iterative refinement of interfaces before deployment [9]. Additionally, multivariant UI personalization techniques allow dynamic adaptation of interface elements based on user behavior, contributing to increased engagement and satisfaction [10].

Beyond individual tasks, AI has been increasingly incorporated into collaborative and co-creative design processes. Large Language Models (LLMs) and AI-augmented frameworks have been used to facilitate communication among multidisciplinary teams, particularly in complex environments such as mixed reality design [7]. These systems position AI not only as a tool but as an active participant in the design process, supporting ideation and interaction through continuous collaboration with human designers [4], [6].

B. Challenges in Human-AI Collaboration for Design

Despite these advances, the adoption of AI in design and web development presents several challenges that directly impact human-AI interaction. One of the most prominent issues is the lack of transparency and explainability in AI-

generated outputs. Designers often struggle to interpret how AI systems arrive at specific suggestions, which can reduce trust and limit effective use of these tools [4], [9].

Another recurring challenge is the balance between automation and human creative control. While AI systems can significantly enhance efficiency, they may constrain designers' ability to refine or adapt generated outputs according to specific project requirements. This tension has been observed particularly in AI-generated visual content, where limited control over outputs affects usability and acceptance [3], [5].

Usability and integration issues also persist. Many AI-driven tools introduce additional cognitive load, particularly when they are not well aligned with existing workflows. In collaborative environments, the integration of AI-generated content in real time remains complex, requiring careful coordination between human and artificial agents [6], [7].

Furthermore, ethical concerns such as bias in AI-generated content and uncertainties regarding intellectual property continue to pose barriers to adoption. These challenges emphasize the importance of designing AI systems that are not only technically capable but also transparent, controllable, and aligned with human values and practices [11].

C. Gap: AI Support in Early-Stage Client Interactions

While prior work has extensively explored the application of AI in design ideation, usability optimization, and human-AI co-creation, these approaches predominantly focus on downstream stages of the design process, where requirements are already defined and clients are already engaged.

In contrast, early-stage interactions such as client discovery and lead qualification remain largely underexplored. These stages involve interpreting incomplete and ambiguous information, assessing client fit, and making decisions about whether to initiate a project. Such processes are inherently uncertain and require cognitive effort related to evaluation, judgment, and decision-making.

Despite their importance, there is limited research on how AI can support these early-stage activities, particularly in small-scale professional contexts such as independent web design studios. Existing AI applications do not adequately address how designers can be supported in evaluating potential clients, structuring initial interactions, and making informed decisions before project commitment.

This gap highlights an opportunity to investigate AI not only as a tool for design production but as a decision support system in early-stage client interactions. Addressing this gap is essential for understanding how human-AI collaboration can extend beyond design execution to support critical decision-making processes in professional practice.

III. RESEARCH QUESTION

Despite the increasing availability of AI-supported tools in design and development, the early stages of client discovery and lead qualification in web development remain largely informal and weakly structured. In these stages, independent web designers must interpret incomplete information, assess

client fit, and decide whether to proceed with a potential project. These decisions are made under uncertainty and without systematic support, often relying on subjective judgment and fragmented communication [1].

From a Human-Computer Interaction perspective, this scenario highlights a gap in supporting decision-making processes during early-stage client interactions. While prior work has explored AI in downstream design activities, less attention has been given to how AI can assist professionals in evaluating, understanding, and selecting clients before project initiation [4], [6].

This research addresses the following research question:

How does an AI-supported client discovery and lead qualification pipeline influence designers' decision-making processes during early-stage client interactions?

To operationalize this question, the study investigates how the proposed pipeline affects (1) decision confidence, (2) clarity of client requirements, and (3) perceived effort during client discovery and lead qualification, in line with established perspectives on evaluation in software engineering and design science [2], [12].

IV. PROPOSED APPROACH

As illustrated in Figure 2, this work proposes an AI-supported pipeline for client discovery and lead qualification in web development, designed as a human-AI decision support system. The objective of the pipeline is to assist independent web designers in evaluating potential clients during early-stage interactions, supporting more structured, consistent, and informed decision-making processes.

The pipeline integrates generative AI, lead scoring mechanisms, and automated orchestration through an iPaaS. It is grounded in Customer Success principles [8] and structured to support both information gathering and interpretation during client discovery.

A. Overview of the Pipeline

The proposed pipeline is organized into four main stages: (1) initial interaction, (2) information structuring, (3) lead qualification, and (4) diagnostic output generation.

In the initial interaction stage, as shown in Figure 3, conversational AI agents engage with prospective clients to collect relevant information about their needs, context, and expectations. The interaction is designed to be adaptive and human-centered, aligning with recent approaches to AI-supported conversational design [7].

In the information structuring stage, the collected data are processed and organized into a structured format, enabling further analysis. This stage transforms unstructured conversational input into interpretable representations that can support decision-making.

In the lead qualification stage, illustrated in Figure 4, the structured information is evaluated against a predefined ICP using lead scoring mechanisms. The model represents a simplified scoring structure combining perceived fit with the ICP and client interest, adapted from established lead scoring

AI-SUPPORTED LEAD PROSPECTING PIPELINE



Fig. 2. AI-supported lead prospecting pipeline integrating client discovery, lead qualification, decision support, and orchestration.

practices [13] and operationalized in the context of this study. The lead scoring mechanism is based on objective criteria aligned with the ICP. Scores are assigned according to factors such as digital transformation intent, problem-solution fit, alignment with the target audience, level of interest, minimum digital maturity, and timing. This structured scoring approach enables the classification of leads in terms of their fit and priority within the pipeline, supporting more consistent and informed decision-making. This process allows designers to assess the alignment between the potential client and their strategic objectives.

Finally, in the diagnostic output generation stage, the pipeline produces artifacts to support decision-making, including summaries of client requirements and AI-generated non-functional website mockups. These outputs provide designers with a synthesized view of the opportunity, facilitating evaluation and comparison between leads.

B. Human-AI Interaction Design

The pipeline is designed following a human-in-the-loop approach, where AI supports but does not replace human decision-making [4], [6]. Designers remain responsible for interpreting outputs and making final decisions, while AI assists in organizing information, reducing uncertainty, and providing structured insights.

Conversational AI plays a central role in mediating interaction with prospective clients. The design of these interactions prioritizes clarity, natural language flow, and adaptability to user input. The system aims to balance automation with user control, allowing designers to intervene, adjust, or reinterpret outputs when necessary, addressing known challenges in human-AI collaboration [4].

C. System Architecture

The system architecture, presented in Figure 5, is implemented using an iPaaS, which orchestrates communication between different components, including conversational AI agents, data processing modules, and output generation services.

The system communicates with generative AI services through webhook-based integrations, enabling the exchange of structured data between components of the pipeline. These interactions rely on JSON-formatted outputs to standardize the representation of collected information and diagnostic results across the system.

Generative AI models are used both for conversational interaction and for generating diagnostic artifacts. The modular architecture enables flexibility in integrating different tools and adapting the pipeline to specific contexts or workflows.

As illustrated in Figure 6, the orchestration layer translates qualification outcomes into coordinated workflows and automated actions.

Table I summarizes the main components of the proposed pipeline and their implementation.

D. Design Rationale

The design of the pipeline is informed by challenges identified in prior work, including the lack of structured support for early-stage interactions, limitations in transparency and control in AI systems, and difficulties in integrating AI into existing workflows [4], [6], [9].

By structuring client discovery as a decision support process, the pipeline aims to extend the role of AI beyond design execution to support cognitive activities such as evaluation, interpretation, and decision-making under uncertainty.

Additionally, the use of structured outputs and visual artifacts is intended to improve clarity and reduce ambiguity, addressing known challenges in human-AI collaboration related to trust and usability [5].

E. Implementation Status

A functional prototype of the proposed pipeline has been developed and is currently under exploratory evaluation. The

AI-Supported Customer Discovery Interaction

From unstructured customer input to structured information for decision support.

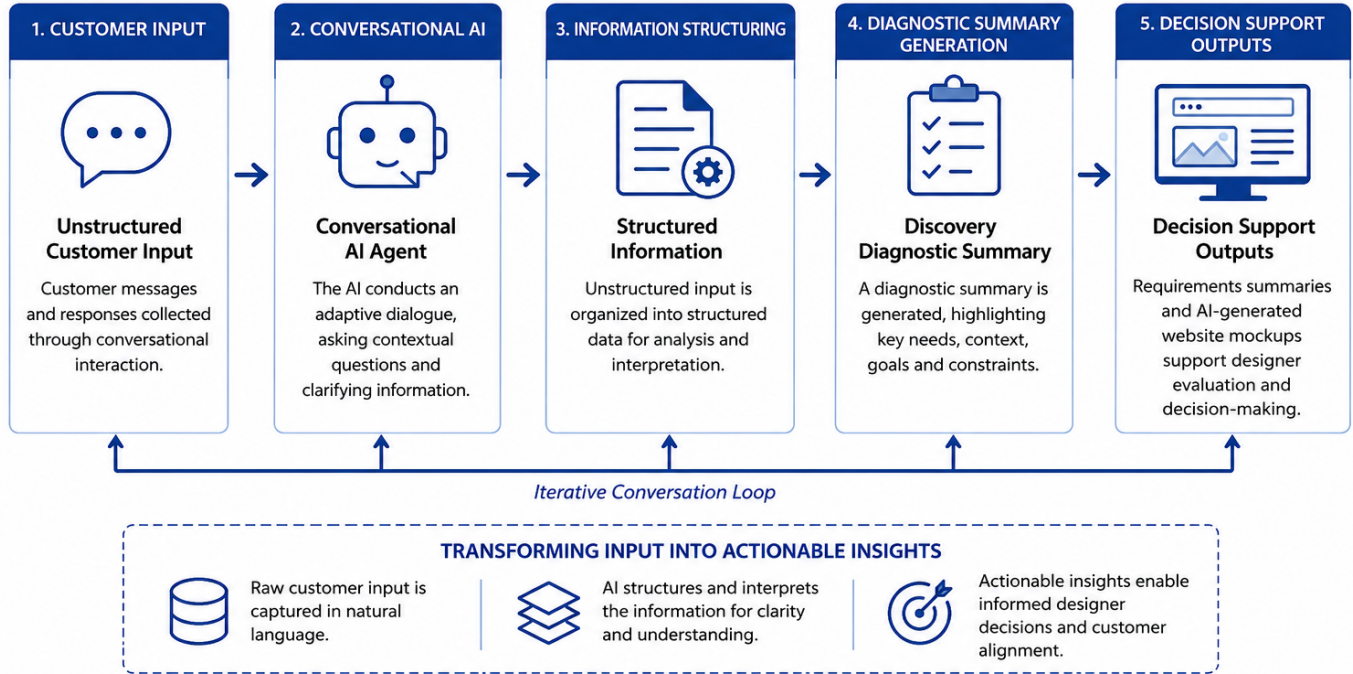


Fig. 3. AI-supported customer discovery interaction showing how conversational AI transforms unstructured customer input into structured diagnostic artifacts for human-AI decision support.

Fit (ICP)				
A	A4	A3	A2	A1
B	B4	B3	B2	B1
C	C4	C3	C2	C1
D	D4	D3	D2	D1
Interest	4	3	2	1

Fig. 4. Lead qualification model based on the relationship between ICP fit and client interest, adapted from established lead scoring practices and operationalized in this study.

prototype integrates conversational agents, automated workflows, and generative AI components, enabling end-to-end interaction from initial client engagement to diagnostic output generation.

The current implementation focuses on validating the feasibility of the approach and identifying opportunities for refinement, particularly in terms of interaction design and information quality during early-stage client engagement.

V. DISCUSSION

The proposed pipeline has been implemented as a functional proof of concept integrating conversational generative AI, lead scoring logic, and iPaaS-based orchestration. In addition to supporting client discovery and qualification, generative AI

was also employed during the design and development of the pipeline itself, assisting in tasks such as prompt refinement, interaction flow design, and iterative prototyping. This reflects an AI-assisted development process, aligned with emerging perspectives on human-AI co-creation in design [4], [6].

Exploratory evaluations have been conducted through iterative testing of the pipeline in realistic usage scenarios. The evaluation involved three participants with prior experience in web design and client interaction processes. These initial observations are based on participants' responses to structured Likert-scale questionnaire items and qualitative feedback. They focus on perceived decision confidence, clarity of client requirements, and perceived effort, and indicate improvements in these dimensions during early-stage interactions, as summarized in Table II. Given the exploratory nature of the pre-test and the limited number of participants, these findings should be interpreted as indicative rather than conclusive. At this stage, the evaluation remains qualitative and formative, focusing on identifying strengths and limitations.

The questionnaire items were grouped into three analytical dimensions: decision confidence, clarity of client requirements, and perceived effort, based on their semantic alignment with the constructs evaluated.

The results are summarized in Table II.

This ongoing evaluation informs iterative improvements to

Implementation Architecture (Modular View)

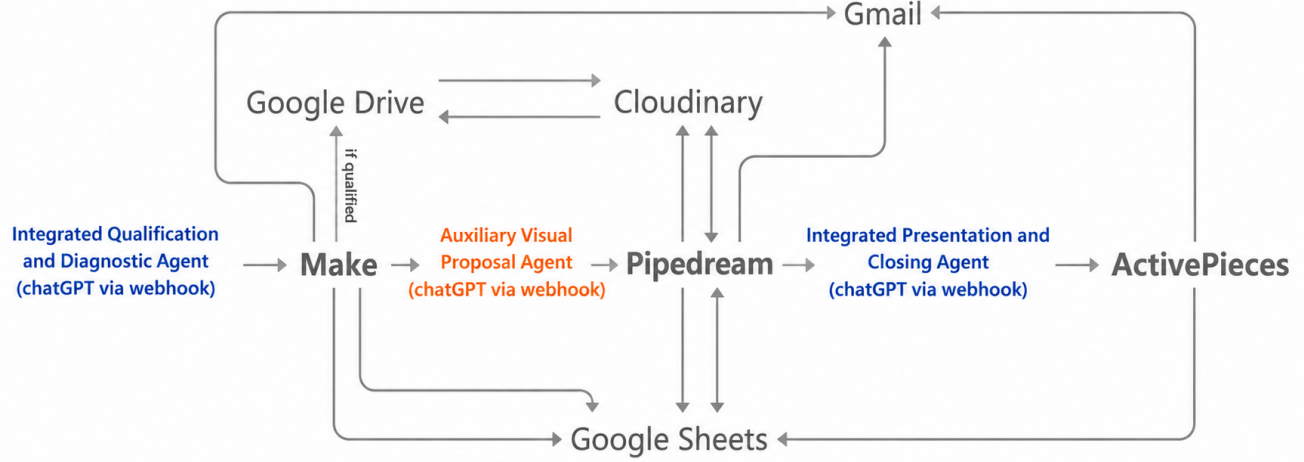


Fig. 5. Modular implementation architecture of the proposed pipeline, integrating AI agents, workflow orchestration, CRM services, data repositories, and external platforms to support client discovery, lead qualification, proposal generation, and sales decision-making.

TABLE I
TECHNICAL OVERVIEW OF THE AI-SUPPORTED LEAD QUALIFICATION PIPELINE.

Component	Implementation
Conversational AI	LLM accessed via webhook, used for client discovery dialogue, qualitative interpretation, and generation of structured diagnostic outputs (JSON).
Prompt Design	System prompts grounded in Customer Discovery and Customer Success principles to elicit goals, constraints, and context.
Lead Scoring	Rule-based scoring aligned with an ICP, combining perceived fit and interest to support decision-making.
Automation (iPaaS)	iPaaS platform orchestrating data flow, agent coordination, and workflow triggers between qualification stages.
Data Storage	Lead data and scoring results stored in shared spreadsheets to enable transparency and manual review.
Human-in-the-Loop	Final decisions (follow-up, prioritization, acceptance) remain under designer control.

the pipeline design and interaction flow, in line with the principles of Design Science Research [2].

These findings, although preliminary, suggest that structuring early-stage client interactions through AI-supported pipelines may enhance designers' ability to understand client needs and make more confident decisions. The observed improvement in clarity aligns with prior research indicating that

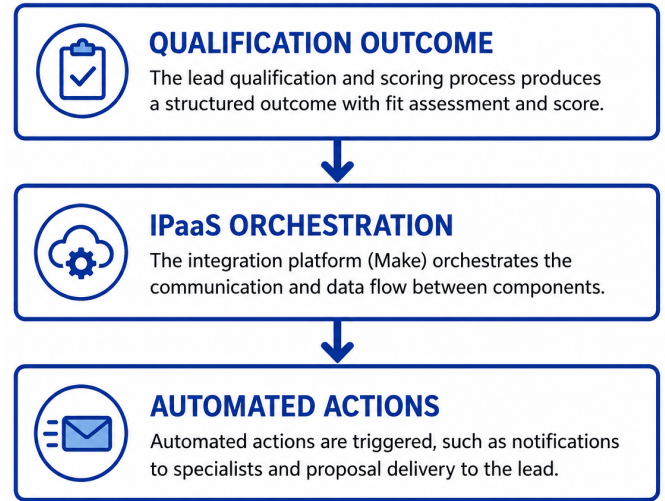


Fig. 6. Workflow orchestration after lead qualification showing how the system automates communication and follow-up actions through an iPaaS platform.

conversational AI can support articulation and interpretation of user requirements [4].

Similarly, the reported levels of perceived effort suggest that AI assistance may help reduce cognitive and operational burden during early-stage interactions, although this effect remains modest and context-dependent. These results are consistent with studies highlighting the role of AI in supporting cognitive processes such as understanding and decision-making in design contexts [6].

TABLE II
SUMMARY OF EXPLORATORY EVALUATION (N=3)

Dimension	Mean (1–5)
Decision Confidence	3.7
Clarity	4.6
Perceived Effort	3.5

From a practical perspective, these findings indicate that AI-supported qualification pipelines may offer value for independent web designers by structuring client discovery and reducing ambiguity in early interactions. However, given the limited number of participants and the exploratory nature of the evaluation, these observations should be interpreted with caution. Further studies with larger samples and controlled experimental designs are needed to validate these effects and assess their generalizability.

From a broader perspective, this work contributes to Human–Computer Interaction by framing client discovery and lead qualification as a human–AI decision-making problem in early-stage interactions. The proposed pipeline demonstrates how generative AI, lead scoring mechanisms, and automated orchestration can be integrated to support structured and informed decision-making processes.

Additionally, the study provides insights into how AI can act not only as part of the solution but also as a collaborator in the design and development of interactive systems. These findings contribute to ongoing discussions on human–AI collaboration in professional contexts, particularly in scenarios involving uncertainty, evaluation, and decision-making.

VI. FUTURE WORK

Future work will focus on the systematic evaluation and refinement of the proposed pipeline. Planned studies include controlled evaluations with professionals engaged in web development and digital services, aiming to assess how AI-supported client discovery and lead qualification influence decision-making, perceived effort, and clarity of client requirements.

In addition to qualitative analysis, future iterations will explore the use of quantitative indicators related to lead evaluation processes, where appropriate. Further work will also investigate transparency, explainability, and ethical considerations associated with AI-supported qualification processes, particularly in relation to trust, accountability, and professional autonomy.

Future studies may also investigate guidelines for defining and evolving Ideal Customer Profiles (ICPs), as well as dashboard-based mechanisms to support continuous refinement of qualification criteria and customer success strategies. Future evaluations may compare ICP-based qualification with conversational AI approaches that do not employ explicit qualification criteria.

These future directions aim to strengthen both the empirical grounding and the design implications of the proposed pipeline within HCI research on human–AI collaboration.

VII. DECLARATION ON GENERATIVE AI

During the preparation of this work, the author(s) used ChatGPT and Grammarly in order to: Grammar and spelling check, Paraphrase and reword. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the publication’s content.

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APÊNDICE C

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*Evaluating an AI-Supported Customer Discovery and Lead
Qualification Pipeline for Website Development*

Evaluating an AI-Supported Customer Discovery and Lead Qualification Pipeline for Website Development

Ana Carolina Malveira
Ferreira
Universidade Federal de Itajubá -
UNIFEI
Itajubá, Brazil
anacarolina@unifei.edu

Adler Diniz de Souza
Universidade Federal de Itajubá -
UNIFEI
Itajubá, Brazil
adlerdiniz@unifei.edu.br

Josef Spillner
Zurich University of Applied
Sciences (ZHAW)
Zurich, Switzerland
josef.spillner@zhaw.ch

ABSTRACT

Customer discovery and lead qualification are critical activities in web development projects, directly influencing requirement elicitation, project planning, and decision-making. Despite advances in Generative Artificial Intelligence (GenAI), its application to support early-stage customer discovery processes remains underexplored.

This paper presents an exploratory evaluation of an AI-supported customer discovery and lead qualification pipeline designed to support interactions between service providers and potential clients in web development projects. Developed following a Design Science Research approach, the proposed artifact integrates conversational AI, automated requirement elicitation, lead qualification based on an Ideal Customer Profile (ICP), and the generation of structured project artifacts.

The evaluation involved individuals with diverse professional backgrounds who interacted with the pipeline and completed pre-use and post-use assessment instruments. Quantitative and qualitative analyses were conducted to investigate perceptions related to requirement elicitation, project understanding, and interaction quality.

The results indicate positive perceptions regarding needs identification, understanding of project requirements, and ease of interaction. Participants reported that the conversational process helped clarify objectives, structure ideas, and identify requirements that had not been previously considered. At the same time, the findings revealed opportunities for improvement related to proposal generation, presentation, and personalization.

These findings provide preliminary evidence that AI-supported customer discovery pipelines can support requirement elicitation and decision-making in web development contexts. The study contributes to ongoing discussions on Human-AI Collaboration and Decision Support Systems by exploring the role of conversational AI in the early stages of client engagement and project definition.

KEYWORDS

Generative Artificial Intelligence, Customer Discovery, Lead Qualification, Human-AI Collaboration, Decision Support Systems, Requirement Elicitation, Web Development, Design Science Research

1 INTRODUCTION

Generative Artificial Intelligence (GenAI) has rapidly transformed digital design and software development practices, enabling new forms of automation, creativity support, and human-AI collaboration [3, 5, 12, 14]. Recent studies have explored the use of GenAI in graphic design, interface generation, collaborative design environments, and web development workflows, highlighting its potential to support both creative and technical activities throughout the development lifecycle [2, 3, 13]. As these technologies mature, researchers and practitioners have increasingly investigated how AI systems can augment human decision-making rather than simply automate isolated tasks [5, 14].

In web development projects, one of the most critical yet frequently overlooked stages occurs before implementation begins. Early interactions between service providers and prospective customers involve understanding business goals, identifying user needs, eliciting requirements, and determining whether a project aligns with organizational capabilities and strategic objectives. These activities are commonly associated with customer discovery and lead qualification processes. Despite their importance, they are often conducted through informal conversations, unstructured questionnaires, or subjective assessments, creating risks of communication failures, incomplete requirements, and poor project selection decisions.

While existing research has extensively investigated AI-assisted design generation, usability support, and collaborative creativity [3, 5, 12, 14], relatively little attention has been given to the use of GenAI for supporting customer discovery and lead qualification in web development contexts. This represents an important research opportunity, as advances in large language models and workflow automation technologies create new possibilities for structuring early-stage interactions, supporting requirement elicitation, and assisting decision-making processes.

Recent studies have also highlighted the potential of AI to support cognitive activities such as understanding, interpretation, and decision-making during complex design

processes [8, 13]. However, most existing approaches focus on downstream stages of development, where requirements have already been established and project scope is relatively well defined. Consequently, there remains limited understanding of how AI can assist professionals during the highly uncertain and exploratory stages of customer discovery and lead qualification.

To address this gap, this study investigates an AI-supported customer discovery and lead qualification pipeline designed to assist early-stage interactions in web development projects. The proposed artifact integrates conversational AI, automated requirement elicitation, lead qualification mechanisms based on an ICP, and the generation of structured project artifacts intended to support human decision-making. The pipeline was developed following Design Science Research principles [6, 9] and was previously introduced and preliminarily evaluated through an expert-based assessment.

Building upon this initial work, the present study reports an exploratory evaluation of the proposed pipeline involving participants with different backgrounds, including domain specialists and prospective customers. The evaluation investigates how interaction with the artifact influences decision confidence, clarity of customer requirements, and perceived effort during customer discovery activities. Additionally, qualitative feedback is analyzed to identify perceived benefits, limitations, and opportunities for improvement.

The main contribution of this paper is the presentation of empirical evidence regarding the use of an AI-supported customer discovery and lead qualification pipeline in web development scenarios. The findings contribute to ongoing discussions on Human–AI Collaboration, Decision Support Systems, and the application of Generative Artificial Intelligence in software and web development processes.

The remainder of this paper is organized as follows. Section 2 presents the related work. Section 3 describes the research method. Section 4 presents the proposed pipeline. Section 5 reports the evaluation procedure and results. Section 6 discusses the findings and implications. Section 7 presents the study limitations. Finally, Section 8 concludes the paper and outlines directions for future work.

2 RELATED WORK

2.1 AI in Web Development and Design

The application of Artificial Intelligence (AI) in web development and digital design has expanded significantly in recent years. Advances in generative AI, machine learning, and large language models have enabled new approaches for interface generation, design ideation, usability evaluation, and workflow automation. Previous studies have demonstrated that AI can support designers by accelerating repetitive tasks, facilitating the exploration of alternative solutions, and assisting in the creation of user-centered interfaces [2, 3].

Recent research has also explored AI-supported web development workflows, including adaptive interfaces, usability prediction, and collaborative design environments [8, 11, 12].

These studies highlight the growing role of AI as a complementary resource capable of supporting both technical and creative activities throughout the development lifecycle.

2.2 Human–AI Collaboration and Decision Support

Beyond automation, contemporary research increasingly investigates AI as a collaborative partner in decision-making and design activities. Human–AI collaboration frameworks emphasize the importance of maintaining human oversight while leveraging AI capabilities to support exploration, interpretation, and problem-solving [5, 14].

In design contexts, AI systems have been used to assist ideation, structure information, and support reasoning processes. For example, AI-assisted causal diagrams have been proposed to help designers understand relationships between design decisions and outcomes, improving transparency and supporting more informed decisions [13]. Despite these advances, challenges related to explainability, trust, usability, and alignment with human workflows remain important research topics [5, 10].

2.3 Customer Discovery and Lead Qualification

Customer discovery is a systematic process aimed at understanding customer needs, expectations, and contextual factors before solution development [1]. In web development projects, this stage is closely related to requirement elicitation and project scoping, directly influencing subsequent design and implementation activities.

Lead qualification complements customer discovery by evaluating the alignment between prospective customers and pre-defined business objectives, often represented through mechanisms such as Ideal Customer Profiles (ICPs). While these activities play a central role in service-oriented businesses, they are frequently conducted through informal interactions and subjective assessments.

Although AI has been widely investigated in design generation and development support, limited attention has been given to its application in customer discovery and lead qualification processes. Existing studies primarily focus on downstream design activities, where requirements have already been established. Consequently, there remains a gap in understanding how AI can support professionals during the early stages of client engagement, particularly in contexts involving uncertainty, requirement elicitation, and decision-making. This gap motivates the investigation presented in this paper.

3 RESEARCH METHOD

This study adopted the Design Science Research (DSR) methodology as the primary research approach [6, 9]. DSR is particularly suitable for investigations focused on the design, implementation, and evaluation of artifacts intended to address practical problems while generating scientific knowledge [6]. Following this perspective, the research involved the development and evaluation of an AI-supported customer

discovery and lead qualification pipeline designed to support early-stage interactions in web development projects.

3.1 Research Question

The study investigates the following research question:

How does an AI-supported customer discovery and lead qualification pipeline influence decision-making processes during early-stage interactions in web development projects?

To operationalize this question, the evaluation focused on three analytical dimensions previously adopted during the preliminary assessment of the artifact:

- Decision Confidence;
- Clarity of Customer Requirements;
- Perceived Effort.

These dimensions were used to assess participants' perceptions regarding the effectiveness of the proposed pipeline in supporting customer discovery and lead qualification activities.

3.2 Participants

The evaluation involved participants with different backgrounds, including potential users of web development services. Participants were recruited through convenience sampling and voluntarily agreed to participate in the study.

Only data collected during the June 2026 evaluation cycle were considered in this study.

3.3 Data Collection Instruments

Three instruments were employed during the evaluation process.

First, an Academic Survey was used to collect demographic information and characterize participants according to their professional background, experience with Artificial Intelligence technologies, and previous experience with AI-supported design or development tools.

Second, a Pre-Use Questionnaire was applied before participants interacted with the pipeline. This instrument investigated previous experiences with website development services, difficulties encountered during customer-provider interactions, and expectations regarding the use of an AI-supported solution.

Finally, a Post-Use Questionnaire was administered after participants completed the interaction with the pipeline. The instrument combined Likert-scale items and open-ended questions to evaluate participants' perceptions regarding requirement elicitation, understanding of project needs, interaction quality, proposal adequacy, and overall experience.

3.4 Evaluation Procedure

The evaluation was conducted using a functional implementation of the proposed pipeline. Participants initially completed the Academic Survey and the Pre-Use Questionnaire. They were then invited to interact with the customer discovery pipeline, which guided them through a structured

conversational process aimed at identifying project goals, requirements, and contextual information.

During the interaction, conversational AI agents collected and organized information, performed lead qualification procedures, and generated supporting artifacts intended to assist decision-making. After completing the interaction, participants received access to the generated proposal and were invited to complete the Post-Use Questionnaire.

3.5 Data Analysis

A mixed-methods approach was adopted.

Quantitative data obtained from the Likert-scale questions were analyzed using descriptive statistics. The analysis focused on identifying tendencies related to decision confidence, clarity of customer requirements, and perceived effort during customer discovery activities.

Qualitative data obtained from open-ended responses were analyzed using thematic analysis. Participant comments were reviewed and grouped into recurrent themes describing perceived benefits, limitations, usability issues, and opportunities for improvement.

The combination of quantitative and qualitative evidence enabled a broader understanding of how participants perceived the proposed pipeline and its contribution to early-stage interactions in web development projects.

4 PROPOSED PIPELINE

Figure 1 presents an overview of the AI-supported customer discovery and lead qualification pipeline evaluated in this study. The artifact was designed to support early-stage interactions in web development projects by combining conversational AI, requirement elicitation, lead qualification mechanisms, and decision-support artifacts.

The pipeline begins with a customer discovery stage, in which participants interact with a conversational AI agent designed to collect information regarding business objectives, project expectations, constraints, and desired website characteristics. This stage aims to support the systematic exploration of customer needs while reducing ambiguity during early interactions.

Information gathered during the interaction is subsequently organized through a requirement elicitation process. The collected responses are transformed into structured project information that can support communication, planning, and project scoping activities.

The next stage involves lead qualification. Based on predefined criteria derived from an Ideal Customer Profile (ICP), the pipeline assists in evaluating the alignment between the prospective customer and the objectives of the service provider. This assessment supports prioritization and contributes to a more structured qualification process.

Following qualification, the pipeline generates supporting artifacts intended to facilitate understanding and decision-making. These artifacts include structured project summaries, diagnostic information, and proposal materials designed to assist communication between stakeholders.



Figure 1: Overview of the AI-supported customer discovery and lead qualification pipeline.

The final outcome of the process is a set of decision-support artifacts that assist professionals during customer discovery and project qualification activities. Consistent with Human-AI Collaboration principles, the pipeline does not replace human judgment. Instead, it provides structured information and recommendations that support professionals in making informed decisions during the early stages of web development projects.

5 EVALUATION AND RESULTS

5.1 Participants

A total of 14 participants completed the customer discovery workflow and were included in the study population. Among them, 10 were classified as qualified leads according to the pipeline criteria, while 4 were categorized as follow-up opportunities.

Participants represented diverse professional backgrounds, including software development, engineering, data science, education, customer success, sales, and related areas. Most participants were between 18 and 34 years old and reported previous experience with generative AI technologies, ranging

from occasional use to advanced practical application in professional or academic contexts.

The quantitative and qualitative analyses presented in this paper are based on the 10 qualified leads who completed the full evaluation cycle and submitted valid post-use responses. At the time of writing, post-use responses from the follow-up opportunities were not yet available.

This diversity enabled the collection of perspectives from participants with varying levels of technical expertise and familiarity with AI-supported tools and digital service workflows.

5.2 Pre-Use Expectations

Participants expected the pipeline to accelerate customer discovery activities, improve communication between clients and developers, clarify project requirements, and reduce ambiguity during website development projects.

5.3 Quantitative Results

Participants evaluated the proposed pipeline through eight Likert-scale items addressing different aspects of the customer

Table 1: Descriptive statistics for the post-use evaluation questionnaire (n=10).

Item	Mean	SD
Q1 (Needs identification)	4.4	0.70
Q2 (Briefing quality)	3.7	1.25
Q3 (Service understanding)	3.8	1.40
Q4 (Hiring intention)	3.7	1.25
Q5 (Ease of interaction)	4.4	0.97
Q6 (Visual proposal adequacy)	3.4	1.51
Q7 (Communication of benefits)	3.9	1.01
Q8 (Understanding of needs)	4.5	0.53

discovery experience. Table 1 presents the descriptive statistics, while Figure 2 summarizes the mean scores obtained for each item.

The internal consistency of the post-use questionnaire was evaluated using Cronbach's alpha. The resulting coefficient ($\alpha = 0.81$) indicates acceptable-to-good internal consistency among the questionnaire items, suggesting that the instrument provided reliable measurements of participant perceptions regarding the proposed pipeline.

Overall, the results indicate positive perceptions of the evaluated artifact. All items achieved mean scores above 3.0, suggesting generally favorable assessments across the evaluated dimensions.

The highest mean score was observed for Q8 (Understanding of Needs), with a mean of 4.5 (SD = 0.53). This result suggests that participants perceived the interaction as helpful for understanding and reflecting on their project needs. High scores were also obtained for Q1 (Needs Identification) and Q5 (Ease of Interaction), both with a mean of 4.4, indicating positive perceptions regarding the customer discovery process and the interaction experience.

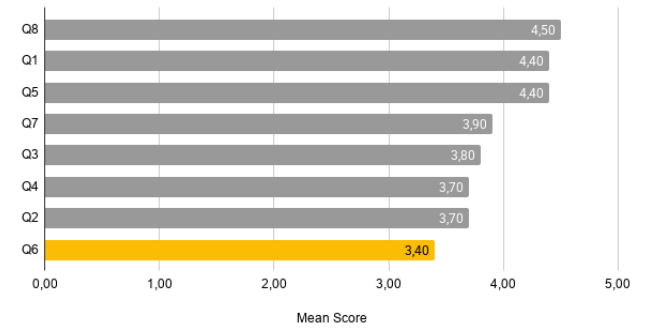
Intermediate results were observed for Q7 (Communication of Benefits), with a mean of 3.9 (SD = 1.01), and Q3 (Service Understanding), with a mean of 3.8 (SD = 1.40). Q2 (Briefing Quality) and Q4 (Hiring Intention) both achieved mean scores of 3.7 and standard deviations of 1.25.

The lowest mean score was obtained for Q6 (Visual Proposal Adequacy), with a mean of 3.4 (SD = 1.51). In addition to presenting the lowest average score, this item exhibited the highest variability among participants, indicating greater variability in participant perceptions regarding the adequacy of the generated proposal.

Taken together, the quantitative results suggest that participants perceived greater value in aspects related to customer discovery, needs identification, and project understanding, while proposal-related aspects exhibited greater variability and represent important opportunities for future refinement of the pipeline.

5.4 Qualitative Feedback

Table 2 summarizes the main themes identified in the qualitative feedback collected during the evaluation. These themes

Figure 2: Mean scores obtained for each post-use evaluation item (n=10).**Figure 2: Mean scores obtained for each post-use evaluation item (n=10).**

complement the quantitative findings by providing additional context regarding participants' experiences with the proposed pipeline.

Qualitative feedback revealed positive perceptions regarding the customer discovery process and the overall interaction quality. Several participants reported that the conversational agent asked relevant questions, helped clarify project requirements, and encouraged reflection about needs that had not been previously considered.

Participants also highlighted the structured nature of the interaction and the contribution of the pipeline to understanding project objectives and website requirements. These observations are consistent with the high scores obtained for Needs Identification (Q1), Ease of Interaction (Q5), and Understanding of Needs (Q8).

The most frequently reported opportunities for improvement were associated with proposal generation and delivery. Participants described difficulties accessing the generated proposal, interruptions during the presentation stage, and situations in which the final visual output did not fully reflect the information collected during customer discovery.

Additional suggestions focused on branding alignment and interaction design. Participants expected stronger consideration of existing visual identities and proposed improvements such as guided response mechanisms, predefined options, and smoother transitions between interaction stages.

Overall, the qualitative evidence reinforces the quantitative findings by indicating that the proposed pipeline successfully supports customer discovery and requirement elicitation activities while revealing opportunities for improving proposal generation, visual communication, and interaction design.

6 DISCUSSION

The findings suggest that the proposed pipeline has the potential to support customer discovery activities in the context

Table 2: Main themes identified in the qualitative feedback.

Theme	Summary of Findings
Customer Discovery	Participants reported that the conversational agent helped identify needs, clarify requirements, and reflect on project characteristics that had not been previously considered.
Interaction Quality	The interaction was generally perceived as clear, structured, and easy to follow, although some participants reported interruptions during transitions between stages.
Proposal Generation	Several participants experienced difficulties accessing the generated proposal or reported that the final visual output did not fully reflect the information collected during customer discovery.
Branding Alignment	Participants expected stronger consideration of existing visual identities, branding elements, and organizational communication strategies.
Interaction Design	Suggestions included guided responses, predefined options, checkboxes, smoother transitions between stages, and reduced dependence on external conversational environments.

of website development projects. Both quantitative and qualitative results indicate positive participant perceptions regarding the identification of requirements, the understanding of project needs, and the overall interaction experience.

The highest evaluation scores were associated with Understanding of Needs (Q8), Needs Identification (Q1), and Ease of Interaction (Q5). These results are consistent with participant feedback describing the conversational process as useful for clarifying objectives, structuring ideas, and exploring project requirements. Such findings are aligned with customer discovery principles proposed by Blank [1], which emphasize understanding customer needs before proposing solutions. They are also consistent with Customer Success principles that emphasize early alignment between customer objectives, expectations, and proposed solutions as a foundation for successful service delivery [7].

An important observation emerging from the qualitative feedback concerns the role of the conversational interaction itself. Several participants reported that the questions presented by the agent helped them reflect on project goals, identify relevant functionalities, and recognize requirements that had not been previously considered. One participant explicitly stated that the system suggested features that would not have been identified without the interaction. These observations suggest that conversational AI may contribute not only to process automation but also to requirement elicitation and the structured exploration of customer needs. These observations are also consistent with recent Human-AI collaboration research that highlights the role of AI systems in supporting exploration, reasoning, and design-related decision processes [13, 14].

The qualitative results also reinforce the perception that the interaction design supported participant engagement throughout the customer discovery process. Participants frequently described the conversations as clear, structured, and helpful for organizing ideas related to their projects. This observation is consistent with the high scores obtained for Ease of Interaction (Q5) and contributes to understanding how conversational interfaces can support early-stage project discussions.

At the same time, the results reveal opportunities for improvement in proposal generation and presentation. The lowest score was observed for Proposal Adequacy (Q6), and several participants reported difficulties related to proposal delivery, visualization, and alignment with existing branding elements. Other comments highlighted expectations regarding more personalized proposals and stronger consideration of organizational identity. These findings indicate that, although the customer discovery component of the pipeline was generally well perceived, additional work is required to improve the presentation and personalization of generated artifacts.

As illustrated in Figure 1, the proposed pipeline integrates customer discovery, requirement elicitation, lead qualification, artifact generation, proposal generation, and human decision support into a unified workflow. This integration distinguishes the proposed approach from customer discovery processes focused exclusively on information gathering, extending support to downstream activities associated with proposal development and decision-making.

Particular attention should be given to Proposal Adequacy (Q6), which obtained the lowest mean score and the highest variability among all evaluated items. Qualitative feedback suggests that participant perceptions of proposal quality were influenced not only by the content of the generated artifact but also by technical issues affecting proposal delivery and visualization. Several participants reported difficulties accessing the proposal, interruptions during the presentation stage, or discrepancies between the information provided during customer discovery and the final visual output. These observations indicate that the evaluation of proposal quality may have been affected by both artifact generation and artifact presentation factors. Further details regarding these operational and technical limitations are presented in Section 7.

The visual proposal artifact appears to play a role beyond communication with prospective clients. In addition to supporting sales and qualification activities, it can function as a shared representation of project requirements among stakeholders involved in subsequent development stages. By providing a common reference, the artifact may help reduce

misunderstandings between clients, designers, and developers, facilitating the transition from customer discovery to implementation. This observation suggests that the value of proposal generation extends beyond persuasion and may contribute to alignment and communication throughout the project lifecycle.

As illustrated in Figure 3, the visual proposal artifact can serve as a shared representation between clients and development teams, supporting communication, alignment, and decision-making throughout the project lifecycle.

The results also suggest the importance of the proposal presentation stage within the overall user experience. The pipeline was designed to transform customer discovery outcomes into tangible artifacts capable of illustrating potential solutions. Consequently, limitations affecting proposal presentation may reduce the perceived value of the final stages of the interaction and influence participant evaluations of the generated outputs.

Overall, the findings provide preliminary evidence that AI-supported customer discovery can contribute to requirement elicitation, project understanding, and decision support in website development contexts. The results indicate that participants perceived value in the discovery process itself, particularly in activities related to identifying needs, structuring requirements, and reflecting on project objectives. At the same time, the findings highlight the importance of robust proposal generation and presentation mechanisms as complementary components of the customer discovery process.

7 LIMITATIONS

This study presents several limitations that should be considered when interpreting the results.

First, the evaluation was conducted using a convenience sample composed primarily of graduate students. Although participants represented different professional backgrounds and levels of experience, the sample size remains limited and does not support broad generalization of the findings. Consequently, the results should be interpreted as preliminary evidence regarding the use of AI-supported customer discovery in website development contexts.

Second, the evaluation procedure introduced a methodological limitation related to the collection of post-use feedback. At the time of writing, 14 participants had completed the customer discovery workflow, including 10 qualified leads and 4 follow-up opportunities. The post-use questionnaire was more naturally integrated into the workflow followed by qualified leads, and the quantitative and qualitative analyses presented in this study are therefore based on the 10 qualified leads who completed the full evaluation cycle and submitted valid post-use responses.

Third, the prototype relied on a distributed architecture involving multiple third-party services, including conversational AI, workflow automation platforms, cloud storage services, spreadsheet-based data persistence, email delivery mechanisms, and image hosting services. While this architecture enabled rapid prototyping and evaluation, it also introduced

dependencies beyond the direct control of the researchers. Operational constraints and changes in external services occasionally affected the execution of some workflow stages during the evaluation period.

An important limitation concerns the proposal presentation stage. The proposed pipeline was designed around the generation of visual artifacts intended to communicate customer requirements and support subsequent development activities. In practice, these artifacts were expected to serve as a shared reference for clients and development teams, facilitating the transition from customer discovery to implementation. However, technical constraints affecting artifact delivery and visualization reduced the consistency of this experience during the evaluation period. Because the proposal represented the culmination of the customer discovery process, limitations affecting its presentation may have disproportionately influenced participant perceptions of the final stages of the workflow.

Additionally, qualitative feedback revealed difficulties associated with proposal delivery, visualization, and personalization. Several participants reported interruptions during proposal presentation or indicated that the generated artifacts did not fully reflect branding elements and information provided during customer discovery. These factors may have influenced participant perceptions regarding proposal adequacy and the final stages of the interaction.

Despite these limitations, the study provides initial evidence regarding the potential of AI-supported customer discovery pipelines to support requirement elicitation, project understanding, and decision support in website development projects. Future studies involving larger samples, alternative participant profiles, and more robust deployment environments may contribute to a broader understanding of the proposed approach.

8 CONCLUSION

This paper presented an AI-supported customer discovery pipeline designed to support lead qualification, requirement elicitation, and proposal generation in website development projects. The proposed approach combines conversational AI, workflow automation, and artifact generation to assist the early stages of client engagement and project definition.

The evaluation combined quantitative and qualitative feedback collected from participants who interacted with the pipeline. The results indicate positive perceptions regarding needs identification, understanding of project requirements, and ease of interaction. Participants frequently reported that the conversational process helped clarify objectives, structure ideas, and identify functionalities that had not been previously considered. These findings suggest that conversational AI can provide value beyond information collection by supporting reflective thinking and requirement elicitation activities.

The study also identified opportunities for improvement related to proposal generation and presentation. Although participants generally perceived the customer discovery process

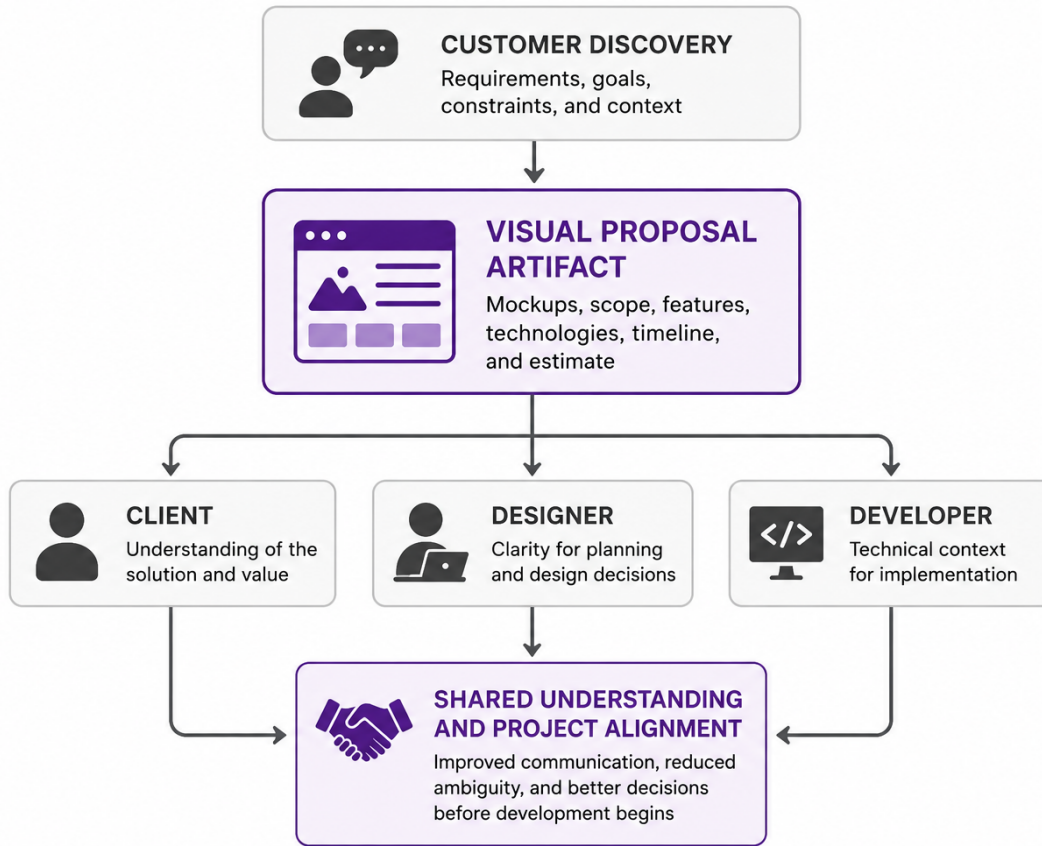


Figure 3: The visual proposal artifact as a shared representation connecting customer discovery and development activities.

positively, feedback highlighted the importance of producing visual artifacts that accurately communicate requirements, branding elements, and project expectations. The results suggest that proposal presentation plays a central role in connecting customer discovery outcomes with subsequent development activities.

Despite the limitations associated with sample size, evaluation design, and infrastructure dependencies, the findings provide preliminary evidence that AI-supported customer discovery pipelines can support requirement elicitation, project understanding, and decision support in website development contexts.

A public repository containing research artifacts, evaluation instruments, and supporting materials associated with this study is available in [4].

Future work includes conducting evaluations with larger and more diverse participant groups, improving proposal generation and presentation mechanisms, investigating alternative deployment architectures that reduce operational dependencies, and expanding the public repository containing research artifacts, evaluation instruments, and supporting materials associated with this work [4]. Additional studies

may also explore the application of similar approaches in other customer discovery scenarios and service-oriented environments. Such investigations may contribute to a broader understanding of Human-AI collaboration in early-stage service design and requirement elicitation activities [10, 14].

9 ETHICAL CONSIDERATIONS

Participation was voluntary and based on informed consent. Data were collected through online questionnaires and interactions with the proposed AI-supported customer discovery pipeline. Personal identifiers were removed from the datasets used for analysis, and all results are reported in aggregated form to preserve participant privacy. The study adopted data handling practices consistent with the principles of the Brazilian General Data Protection Law (LGPD).

10 DECLARATION ON GENERATIVE AI

During the preparation of this work, the author(s) used ChatGPT in order to: Grammar and spelling check, Paraphrase and reword. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the publication's content.

OPEN SCIENCE STATEMENT

To support transparency and reproducibility, the research artifacts associated with this study, including evaluation instruments, anonymized datasets, workflow specifications, and supporting materials, are publicly available in the project repository [4].

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