

申 报	系列：教师系列
	专业：工商管理
	职称：副教授

业绩成果材料

（申报人的业绩成果材料包括论文、科研项目、获奖以及其他成果等）

单 位（二级单位） 华南农业大学经济管理学院

姓 名 蔡文 鋆

材料核对人：

单位盖章：

核对时间：

华南农业大学制

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学校概况 机构设置 师资队伍 人才培养
科学研究 社会服务 校园文化 对外交流
招生就业 学校标识 信息公开 来访预约

关于公示2025年度校级本科教学质量与教学改革工程项目拟立项名单的通知

来源单位及审核人： 编辑： 审核发布：本科生院（招生办公室） 发布时间：2025-09-25

各学院、部处、各单位：

根据《关于开展2025年度校级本科教学质量与教学改革工程项目申报工作的通知》精神,经项目负责人申报、所在单位推荐和学校组织专家评审或本科生院审核等程序，拟立项“基于OBE理念的‘数字赋能、思政融合、产教协同’的《制药设备与工艺设计》课程育人模式研究与实践”等127个项目为2025年度校级本科教学改革项目；拟立项“农林院校‘智能建造’人才特色班”等52个项目为2025年度校级本科质量工程项目。现予以公示，具体名单见附件。

公示期自2025年9月25日至9月29日。如有异议，请在公示期内以书面方式提交至行政楼329房（附必要的证据材料，并署真实姓名），未署真实姓名或逾期者不予受理。

- 附件：1.  2025年度校级本科教学改革拟立项名单.xlsx
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本科生院（招生办公室）
2025年9月25日

（联系人：孙齐胜；电话：85288020）

2025年度高等教育教学改革项目拟立项名单					
序号	类型	项目名称	级别	所在单位	姓名
1	教学改革项目	基于OBE理念的“数字赋能、思政融合、产教协同”的《制药设备与工艺设计》课程育人模式研究与实践	重点	材料与能源学院	林雅铃
2	教学改革项目	基于“AI赋能·科创融合”《中药鉴定学》教学改革探索与实践	重点	林学与风景园林学院	李雁群
3	教学改革项目	善境伦理学与风景园林专业实践教学深度融合的探索与实践	重点	林学与风景园林学院	翁殊斐
4	教学改革项目	面向智慧国土空间规划的《区域规划》数智化教学改革	重点	公共管理学院	李玮
5	教学改革项目	基于批判性思维培养的公共管理类专业课“GenAI+”教学模式探索——以投资学课程为例	重点	公共管理学院	李韵婷
6	教学改革项目	“AI赋能-人机协同”课堂互动重构研究——以C语言课程为例	重点	数学与信息学院 软件学院	彭利民
7	教学改革项目	思政引领和业财融合导向的《中级财务会计》智慧教学改革与实践	重点	经济管理学院	陈晓敏
8	教学改革项目	基于智能设备与线上平台的HIIT混合式体育教学创新设计与实践	重点	体育教学研究部	单宇
9	教学改革项目	“AI+专业知识库”驱动的生态学实验创新设计教学：批判思维培养与实践范式应用	重点	资源环境学院	赵本良
10	教学改革项目	数字孪生与AI融合的《动物组织学与胚胎学》课程体系数智化升级与实践	重点	兽医学院	梁晓欢
11	教学改革项目	融合科学家精神与科研思维的《细胞生物学》“双核育人”改革与实践	重点	动物科学学院	冯敏
12	教学改革项目	《食品标准与法规》创新能力培养体系的构建与应用研究	重点	食品学院	林晓蓉
13	教学改革项目	轻量化AI驱动大学英语听说教改：POA-SOLO双轨分级训练模式	重点	外国语学院	王莹
14	教学改革项目	基于深度学习的大学生高阶思维能力培养的教学模式改革与实践研究——以《作物育种学》为例	重点	农学院	陈婷婷
15	教学改革项目	数智AI赋能高校形象设计教学“三化五全”育人模式的探索	重点	艺术学院	郑丽娜
16	教学改革项目	《车用电机及控制技术》课程“仿真驱动-问题探究”教学模式改革与实践	重点	工程学院	吴双龙
17	教学改革项目	数智化转型中《无机及分析化学》课程思政与 AI 赋能教学融合路径探索	重点	材料与能源学院	高琼芝
18	教学改革项目	校地协同视域下环境工程本科人才实践能力培养路径优化	重点	资源环境学院	林云琴
19	教学改革项目	“产教+科教”双融合下设计类专业创新型复合人才培养模式探索	重点	艺术学院	陈薇薇
20	教学改革项目	AI赋能高校精准化学业指导路径研究	重点	本科生院（招生办）	倪妙珊
21	教学改革项目	智慧教学背景下OBE导向的英语专业实践类课程的转型与重构	重点	外国语学院	朱婕
22	教学改革项目	与极飞科技产教融合的人工智能人才培养探索	重点	电子工程学院（人工智能学院）	熊万杰
23	教学改革项目	聚焦机器视觉课程改革——基于产教融合、科教融汇的卓越应用型人才培养路径探索	重点	电子工程学院（人工智能学院）	杨意
24	教学改革项目	AI赋能学生论文写作的教学改革与实践——基于学生认知视角	重点	经济管理学院	石敏
25	教学改革项目	英国文学史课程的AI知识图谱构建及数智化教学实践研究	重点	外国语学院	李良博
26	教学改革项目	AI赋能《数学分析》一流课程建设的改革与实践研究	重点	数学与信息学院 软件	金玲玉
27	教学改革项目	AI背景下面向农经专业本科生的《大数据 分析与挖掘》课程体系设计与教学模式优化	重点	经济管理学院	文乐
28	教学改革项目	基于大模型辅助的软件体系结构课程生成式编程教学改革与实践	重点	数学与信息学院 软件	林毅申
29	教学改革项目	《种子加工与贮藏学》“理论-实践-实习”三位一体教学的探索和实践	重点	农学院	张亚锋
30	教学改革项目	中华优秀传统文化融入高校思政课程的路径研究——聚焦《马克思主义基本原理》课程	重点	马克思主义学院	禹规娥
31	教学改革项目	新时代应用型人才培养模式创新改革与实践研究——以环境工程专业为例	重点	资源环境学院	陈烁娜
32	教学改革项目	产教融合视域下《家具定制技术》课程“三融四阶五维”教学模式创新与实践	重点	材料与能源学院	郭琼
33	教学改革项目	面向AI赋能的《机械设计基础》“1+1+1+N”混合式教学方法	重点	工程学院	王慰祖
34	教学改革项目	“科研-竞赛-创新”协同融合培养智慧农业拔尖人才探索与实践	重点	工程学院	何杰
35	教学改革项目	基于RAMP原则的“学科——安全”化学实验双线融合教育体系构建与实践	重点	基础实验与实践训练中	林碧敏
36	教学改革项目	基于人工智能与虚拟仿真融合的《分子生物学》智慧课程体系建设与教学模式改革	重点	食品学院	叶志伟
37	教学改革项目	产科教融合视角下茶学专业课程体系优化与实践——以《茶树栽培学》为例	重点	园艺学院	郑鹏
38	教学改革项目	生成式AI驱动农林院校“新文科”教学模式创新——《应急管理概论》智慧课程的建设实践	重点	公共管理学院	游艳玲
39	教学改革项目	面向实践能力提升的新文科（管理学类）AI课堂：数据分析可视化的“教-学-练-评”闭环体系构建	重点	数学与信息学院 软件学院	古万荣
40	教学改革项目	基于“课程思政+产教融合”双驱动的茶叶审评与检验实习课程创新实践	重点	园艺学院	孟慧
41	教学改革项目	基于智能网络的生物化学全英课程改革与实践	重点	生命科学学院	洪梅
42	教学改革项目	植物病理学课程思政教育的创新与实践	自筹	植物保护学院	司徒俊键
43	教学改革项目	三全育人视域下的《病媒生物》思政教学探索与实践	自筹	植物保护学院	王德森
44	教学改革项目	野生动物与自然保护區管理专业（长隆班）实践课程创新研究	自筹	林学与风景园林学院	佟富春
45	教学改革项目	现象学视角下的风景园林专业大一设计基础课程教学改革	自筹	林学与风景园林学院	林毅颖
46	教学改革项目	城市更新背景下风景园林规划与设计 I 课程教学改革——“学生-技术-项目”三位一体教学模式研究	自筹	林学与风景园林学院	古德泉
47	教学改革项目	AI赋能促进《生物统计学》深度学习的教学新模式探索	自筹	林学与风景园林学院	林元震

48	教学改革项目	新农科背景下技术赋能与能力导向融合的实验教学改革——以《药用植物生态学实验》为例	自筹	林学与风景园林学院	龙凤玲
49	教学改革项目	基于“docker+WSL”轻量化构架的混合教学模式在《基因组学与生物信息学实验》中的应用	自筹	园艺学院	曾灶海
50	教学改革项目	AI音乐赋能园艺疗法与大学生心理健康教育的融合研究	自筹	园艺学院	李伟
51	教学改革项目	新农科背景下基于三茶融合视角的思政教学课程融合与路径探索——以《茶艺与茶文化学》为例	自筹	园艺学院	李丹
52	教学改革项目	《智慧树平台与影像病例库协同驱动的影像学教学创新与实践——基于兴趣激发与学习效果双维度优化》	自筹	兽医学院	陈鼻蕾
53	教学改革项目	通过临床案例学习解剖学消化系统下消化道章节	自筹	兽医学院	许丹
54	教学改革项目	人工智能赋能的家畜行为学课程教学改革与实践	自筹	动物科学学院	张玲娜
55	教学改革项目	安全心理学视域下高校科研实验室安全管理的干预机制与路径研究	自筹	资源环境学院	谢洁芬
56	教学改革项目	面向全栈化与智慧化的《网络GIS》课程教学体系优化研究与实践	自筹	资源环境学院	谢健文
57	教学改革项目	基于实景三维中国建设背景下测绘综合应用实习教学改革	自筹	资源环境学院	陈俊林
58	教学改革项目	基于创新能力培养的《水产动物营养与饲料》课程教学改革与实践	自筹	海洋学院	陈世俊
59	教学改革项目	数智化背景下《海洋环境化学》的教学改革探索与实践	自筹	海洋学院	黄玉妹
60	教学改革项目	人工智能赋能基因工程智慧教学模式改革	自筹	生命科学学院	陈亮
61	教学改革项目	AI赋能“新农科”背景下植物生理学课程改革的探索与应用	自筹	生命科学学院	刘宇婷
62	教学改革项目	学科交叉融合助推卓越农林人才培养——以传感器与检测技术课程为例	自筹	工程学院	黄培奎
63	教学改革项目	基于AI赋能的《机械制造基础》课程“三位一体”贯通式教学改革与实践	自筹	工程学院	曹亚超
64	教学改革项目	“AI+教学”模式下控制理论课程思政教学体系构建与实践	自筹	工程学院	邢航
65	教学改革项目	基于OBE理念的混合AI智慧教学模式在机械制造工艺学和夹具设计课程中的应用与实践探索	自筹	工程学院	黄光文
66	教学改革项目	科研反哺教学在《食品包装学》课程中的探索与实践	自筹	食品学院	葛文娇
67	教学改革项目	虚拟仿真实验技术在“食品微生物检验实验”教学中的应用探索	自筹	食品学院	邹苑
68	教学改革项目	城市更新导向的智能数字化城市设计课程教学体系改革研究	自筹	水利与土木工程学院	屈寒飞
69	教学改革项目	基础工程学生可以带手机的课程考核改革实践探索	自筹	水利与土木工程学院	黄金林
70	教学改革项目	以智能建造为目标的土木工程专业升级转型及实践研究	自筹	水利与土木工程学院	杨雨冰
71	教学改革项目	AIGC赋能的《造型设计基础》课程教学改革研究	自筹	材料与能源学院	鲁群霞
72	教学改革项目	“AI赋能-产教融合-思政贯通”导向的《胶合材料学（双语）》新工科教学改革与实践	自筹	材料与能源学院	樊奇
73	教学改革项目	基于构建科学素养的无机及分析化学习题课线上线下混合式教学探索	自筹	材料与能源学院	彭一鸣
74	教学改革项目	新农科背景下的《无机及分析化学》教学改革与实践	自筹	材料与能源学院	胡超凡
75	教学改革项目	《Z世代大学生心理健康教育课程创新研究——短视频与亚文化影响的教育应对》	自筹	数学与信息学院、软件学院	余丹华
76	教学改革项目	AI背景下“线上线下”教学模式在计量经济学理论和实践教学中的应用研究	自筹	数学与信息学院	彭泓毅
77	教学改革项目	课程思政视域下的《数字电路与逻辑设计》课程建设的探索与实践	自筹	数学与信息学院	崔金荣
78	教学改革项目	AI赋能信息系统开发实践课教学创新研究	自筹	数学与信息学院	邓成剑
79	教学改革项目	可视化微积分助力智慧课程建设	自筹	数学与信息学院	马立华
80	教学改革项目	AI赋能《数据结构》教学重构：基于DeepSeek的实践	自筹	数学与信息学院	杨秋妹
81	教学改革项目	AI背景下统计学专业课程的教学方式变革研究	自筹	数学与信息学院	杨志程
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83	教学改革项目	新工科背景下项目驱动的计算机视觉产教融合培养模式构建——以智慧动物管理领域为例	自筹	电子工程学院（人工智能学院）	甘海明
84	教学改革项目	新文科背景下本科生《财务管理》课程数智化建设与教学体系改革研究	自筹	经济管理学院	喻子秦
85	教学改革项目	用计量知识引领人生价值与讲好中国故事——探索计量经济学课程思政教学改革创新	自筹	经济管理学院	苏柳方
86	教学改革项目	新农科背景下《农业创业管理》课程体系与教学模式的优化研究与实践	自筹	经济管理学院	蔡文鋆
87	教学改革项目	新质管理学理论课“双线三链”融合教学改革实践与探索	自筹	公管学院	刘航
88	教学改革项目	新文科背景下GenAI深度赋能的公管类课程智慧教学改革研究——以“管理沟通”为例的“三维联动”创新实践	自筹	公管学院	吴法
89	教学改革项目	适应新文科渗透交叉需要的人才培养模式改革研究与实践	自筹	公管学院	曲霞
90	教学改革项目	民法课程思政建设研究	自筹	人文与法学学院	钟晓雯
91	教学改革项目	社区治理视角下法学专业实践教学模式创新研究与实践	自筹	人文与法学学院	王慧
92	教学改革项目	高校发展性课程评价探索——以学生参与论文成绩评定为例	自筹	人文与法学学院	张艳琼
93	教学改革项目	历史学校一流专业与“长基计划”建设口述史实践教学课程体系改革	自筹	人文与法学学院	杨品优
94	教学改革项目	基于立德树人的《中国现代文学史》课程思政教学改革与实践研究	自筹	人文与法学学院	刘秀丽
95	教学改革项目	大学生思辨能力与课程思政融合培育研究——以《理解当代中国·英语演讲教程》教材为例	自筹	外国语学院	王世龙
96	教学改革项目	多模态英语写作“课程思政+国际传播”融合模式研究	自筹	外国语学院	周燕晖

97	教学改革项目	新文科背景下数智赋能英语专业导学课程人才培养与教学创新实践研究	自筹	外国语学院	沈文静
98	教学改革项目	数据赋能的大学英语深度学习模式研究—基于U校园的混合式合作学习智慧化实践	自筹	外国语学院	彭英
99	教学改革项目	新文科背景下基于多模态认知理论的日语视听说教学模式改革	自筹	外国语学院	杜晓波
100	教学改革项目	动画专业课程赋能“文化新三样”的沉浸式教学体系构建	自筹	艺术学院	李雷鸣
101	教学改革项目	乡村振兴视域下涉农高校音乐剧美育教学的课程思政体系构建与实践研究	自筹	艺术学院	栾志弘
102	教学改革项目	生态优先下包装设计课程体系与内容再设计研究	自筹	艺术学院	潘云
103	教学改革项目	乡村文化融入品牌形象设计课程的教学研究	自筹	艺术学院	王磊
104	教学改革项目	华南农业大学美育浸润行动舞蹈专项	自筹	艺术学院	吴倩晴
105	教学改革项目	华南农业大学美育浸润行动音乐专项	自筹	艺术学院	黎冬霞
106	教学改革项目	华南农业大学美育浸润行动合唱专项	自筹	艺术学院	李美群
107	教学改革项目	华南农业大学美育浸润行动美术教育专项	自筹	艺术学院	罗梦达
108	教学改革项目	双融双创：马克思主义基本原理课OMO-FC融合教学模式的构建与实践	自筹	马克思主义学院	郑丽娟
109	教学改革项目	“第二个结合”融入“马克思主义基本原理”课程教学的机制和路径研究	自筹	马克思主义学院	缪燚晶
110	教学改革项目	中国共产党人精神谱系融入涉农高校“中国近现代史纲要”课程教学研究	自筹	马克思主义学院	周新华
111	教学改革项目	团体正念绘画技术在大学生心理健康教育课程中的运用	自筹	马克思主义学院	梁娟
112	教学改革项目	红色资源数字化：华南农大思政课“耕读红色基因”育人机制研究	自筹	马克思主义学院	黄威威
113	教学改革项目	多学科视角下人工智能赋能高校体育教师专业化实践路径与效果评估	自筹	体育部	陆光平
114	教学改革项目	数字化转型背景下的高校体育教育人才培养模式研究与实践	自筹	体育部	郑壮荣
115	教学改革项目	AI 驱动 CLIL-TBLT 融合的新农科学术英语课程思政教学模式构建与实践	自筹	国际教育学院（都柏林学院）	苏安梅
116	教学改革项目	AI赋能项目管理模块实训改革与研究	自筹	基础实验与实践训练中心	谢虎
117	教学改革项目	农业特色相融合的《工程技能通识训练》改革与实践	自筹	基础实验与实践训练中心	徐相华
118	教学改革项目	“排演研”“三位一体：大学生乐团思政教育课程的实践探索	自筹	党委学生工作部（党委	胡峥
119	教学改革项目	农业高校“双创”教育赋能科技成果转化的衔接机制与实践路径研究	自筹	科学研究院	韩雨辰
120	教学改革项目	高校师生人工智能素养“研-训-赛-用”四维融合提升路径创新研究	自筹	信息网络中心	黄继青
121	教学改革项目	AIGC支持下的教师教学能力提升路径研究	自筹	信息网络中心	李玉玲
122	教学改革项目	数智档案赋能新文科建设研究	自筹	文博馆（档案馆、华南	张家英
123	教学改革项目	高校人事档案知识非专业教学模式探讨	自筹	文博馆（档案馆、华南	曾小武
124	教学改革项目	人机协同视角下 AI 大模型赋能高校信息素养教育重构研究 —— 基于多平台协同的本科毕业论文写作支持体系构建	自筹	图书馆	邓智心
125	教学改革项目	数智时代红色阅读空间赋能思政育人实践研究——以华南农业大学图书馆为例	自筹	图书馆	黄承红
126	教学改革项目	高校图书馆AI知识服务：语义知识库构建及问答策略研究	自筹	图书馆	严一梅
127	教学改革项目	嵌入式信息素养教育赋能食品学科丁颖创新班人才培养研究	自筹	图书馆	曹燕

华南农业大学教育教学研究和改革项目

申 报 书

项目类别 自筹项目

项目名称 新农科背景下《农业创业管理》

 课程体系与教学模式的优化研究与实践

项目负责人 蔡文鋆

职 称 讲师

手机号码 [REDACTED]

所在单位 (公章)

申报日期 2025年6月

华南农业大学 本科生院 制

二 〇 二 五 年 五 月

申请者的承诺与成果使用授权

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项目负责人（签章）：蔡文望

2025年6月9日

此页须手写签字后扫描成 PDF 电子版。

一、项目及项目负责人、项目组简况

项目简况	项目名称	新农科背景下《农业创业管理》课程体系与教学模式的优化研究与实践						
	项目类别	☐ 1. 重点项目 ☒ 2. 自筹项目						
	起止年月	2025 年 9 月-2027 年 9 月						
项目申请人	姓名	蔡文馨		性别	女	出生年月		
	专业技术职务/ 行政职务			讲师/无	最终学位/授予国家		博士研究生/中国	
	所在单位及联系方式	单位名称	经济管理学院			手机号码		
		电子邮箱	linxiaoyan2004@163.com					
	主要教学工作简历	时间	课程名称		授课对象	学时	所在单位	
		2022-2023	《管理研究方法》		本科生	32	经济管理学院	
		2023-2024	《创业管理学》		本科生	32	经济管理学院	
		2023-2025	《农业创业管理》		本科生	32	经济管理学院	
		2023-2025	《农业创业管理实验》		本科生	48	经济管理学院	
	主要教学改革和科学研究工作简历	时间	项目名称					获奖情况
		2023-2024	华南农业大学智库研究项目					无
2025-2026		广州市科技局启航项目					无	
2025-2026		广东省哲学社会科学常规项目					无	
项目组	总人数	职称			学位			
		高级	中级	初级	博士后	博士	硕士	参加单位数
	4	3	1		4		1	
	主要成员 (不含申请者)	姓名	性别	出生年月	职称	工作单位	分工	签名 ²
		杨学儒	男		教授	经管学院	项目思路	
		郭萍	女		副教授	经管学院	教案设计	
		伍敬文	女		副教授	经管学院	教案设计	

²此页须成员手写签字后扫描成 PDF 电子版。

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预算经费总额		4000（元）	
序号	支出科目	预算	支出用途
1	出版/文献/信息传播/ 知识产权事务费	2000	论文发表和文献购买费用
2	数据采集费	500	采集课题所需数据的费用
3	设备费及材料费	500	课题研究中的打印复印费用
4	差旅费	500	其他高校课程考察差旅费用
5	咨询费	500	课题研究咨询专家费用
6	其他支出		

六、单位意见

所在单位意见：

同意推荐

(公章)

单位负责人签字：

2015年 6 月 18 日



国家自然科学基金资助项目批准通知

(包干制项目)

蔡文鋆 先生/女士:

根据《国家自然科学基金条例》、相关项目管理办法规定和专家评审意见,国家自然科学基金委员会(以下简称自然科学基金委)决定资助您申请的项目。项目批准号: 72504096, 项目名称: 人机诊疗分歧研究: 概念结构、双刃剑效应与治理策略, 资助经费: 30.00万元, 项目起止年月: 2026年01月至 2028年12月, 有关项目的评审意见及修改意见附后。

请您尽快登录科学基金网络信息系统(<https://grants.nsfc.gov.cn>), **认真阅读《国家自然科学基金资助项目计划书填报说明》并按要求填写《国家自然科学基金资助项目计划书》(以下简称计划书)**。对于有修改意见的项目,请您按修改意见及时调整计划书相关内容;如您对修改意见有异议,须在电子版计划书报送截止日期前向相关科学处提出。

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向自然科学基金委提交电子版计划书、报送纸质版计划书并补交申请书纸质签字盖章页截止时间节点如下:

1. **2025年9月5日16点:** 提交电子版计划书的截止时间;
2. **2025年9月12日16点:** 提交修改后电子版计划书的截止时间;
3. **2025年9月23日:** 报送纸质版计划书(一式两份,其中一份包含申请书纸质签字盖章页)的截止时间。
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附件：项目评审意见及修改意见表

国家自然科学基金委员会
2025年8月27日



项目批准号	72504096
申请代码	
归口管理部门	
依托单位代码	51064208A0499-0932



国家自然科学基金 资助项目计划书 (包干制项目)

资助类别：青年科学基金项目（C类）[原青年科学基金项目]

亚类说明：

附注说明：

项目名称：人机诊疗分歧研究：概念结构、双刃剑效应与治理策略

资助经费：30万元 执行年限：2026.01-2028.12

负责人：蔡文鋆 BRID：

通讯地址：广东省广州市天河区五山路483号华南农业大学经济管理学院

邮政编码：510642 电 话：

电子邮件：

依托单位：华南农业大学

联系人：郑雪宜 电 话：020-85280070

填表日期：2025年08月29日

国家自然科学基金委员会制



简表

项目负责人信息	姓 名	蔡文鋆	性 别	女	出生年月		民 族	汉族
	学 位	博士			职称	讲师		
	是否在站博士后	否			电子邮件			
	电 话				个人网页			
	工 作 单 位	华南农业大学						
	所 在 院 系 所	经济管理学院						
依托单位信息	名 称	华南农业大学					代码	51064208A0499
	联 系 人	郑雪宜			电子邮件	kyc.jhk@scau.edu.cn		
	电 话	020-85280070			网站地址	http://kjc.scau.edu.cn/		
合作单位信息	单 位 名 称							
项目基本信息	项目名称	人机诊疗分歧研究：概念结构、双刃剑效应与治理策略						
	资助类别	青年科学基金项目（C类）[原青年科学基金项目]				亚类说明		
	附注说明							
	申请代码							
	执行年限	2026.01-2028.12						
	资助经费	30万元						

序号	项目类型	任务书编号（批准号）	项目名称	负责人	所在学院	经费
1	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J0056	活性氢自由基的可控生成及其在合成上的应用	杨波	材能学院	5
2	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J0067	碳基钙钛矿太阳能电池上界面低维钙钛矿取向结晶调控	张桂芝	材能学院	5
3	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4568	基于复杂显微结构的超高含量木质纤维-聚烯烃界面作用机制	周海洋	材能学院	5
4	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J1082	生物基环氧树脂树脂纳米复合涂层的制备及海洋防腐性能研究	胡洋	材能学院	5
5	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5460	基于SrAl ₂ O ₄ :Eu ²⁺ ,Dy ³⁺ +长余辉发光材料构建低碳蓄光型植物的研究	张学杰	材能学院	10
6	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7131	高密度生物基硬碳材料的设计合成及致密储钠应用	梁业如	材能学院	30
7	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J3580	面向智能化采摘的单视觉3D特征扩散模型研究	黎源鸿	电子工程学院（人工智能学院）	5
8	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4585	运动轨迹推理及事件演化的母猪高危及交互行为预测研究	甘海明	电子工程学院（人工智能学院）	5
9	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4584	基于极化转换超表面的矢量 OAM 涡旋波研究	楼群	电子工程学院（人工智能学院）	5
10	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J0407	m7G调控猪肌纤维类型形成的初步研究	顾婷	动物科学学院	5
11	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5442	家蚕piR796514和piR1224289调控BmNPV增殖的功能研究	冯敏	动物科学学院	10
12	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4675	丘陵山地果园单轨运输机装卸平台设计及果品装-运-卸全过程减损研究	罗远强	工程学院	5
13	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4161	面向密植柑橘园的农用旋翼无人机构型优化与控制方法研究	申遂愿	工程学院	5
14	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4678	基于计算机视觉与数字孪生技术的荔枝花序三维数字重建	辛伯来	工程学院	5
15	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J1177	面向水果采摘的飞行机械臂结构智能设计优化方法	程碧懿	工程学院	5
16	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J3660	新能源农用底盘动力电源精细化管理与优化控制	卢家欢	工程学院	5
17	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5104	直接碳固体氧化物燃料电池银基阳极的精准调控与热质交换机理研究	蔡位子	工程学院	10
18	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5482	基于分子间作用力调控的熔盐水合物解离木质纤维素的机理研究	马巧智	工程学院	10
19	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5269	可控热膨胀多层级夹芯结构优化设计方法	王昱	工程学院	10
20	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7132	生物质热化学转化制芳烃航油	许细薇	工程学院	30
21	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4565	基于环境DNA宏条形码技术研究珠江口鱼类群落的环境响应机制	邹柯姝	海洋学院	5
22	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4668	在单病毒粒子水平研究石斑鱼RhoQ调控宿主微丝动态影响石斑鱼虹彩病毒SGIV感染的机制	王劭雯	海洋学院	5

23	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4564	石斑鱼虹彩病毒SGIV VP118逃逸宿主天然免疫的分子机制研究	张娅	海洋学院	5
24	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4637	自噬及其相关蛋白 ATG7 调控拟穴青蟹精子发生的分子机制	郝双丽	海洋学院	5
25	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5419	水产养殖环境中生物膜对微塑料老化演变及水生毒理的介导作用与机制	严慕婷	海洋学院	10
26	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J2416	跨学科视角下的人机交互：人工智能对员工创新与团队协作的影响	彭秋萍	经管学院	5
27	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4604	人口负增长背景下土地确权对农村家庭消费的影响及作用机制研究	陈霄	经管学院	5
28	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4980	数智技术冲击与新企业转向：机制、效应与对策研究	蔡文莹	经管学院	5
29	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4595	人机协同情景下绩效评估公平感知影响机制及提升策略研究	徐光毅	经管学院	5
30	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4602	社会化服务网络赋能农业环境可持续发展的机理与实证研究	董莹	经管学院	5
31	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4599	金融化背景下“情绪传染--拥挤交易”对商品期货价格风险涟漪效应的影响研究	周丽云	经管学院	5
32	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4606	光伏新能源技术采纳对农户福利的影响及提升机制研究——以广东省为例	伍敬文	经管学院	5
33	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4601	人民币汇率双向波动背景下我国农业产业链的外汇风险暴露特征及其影响因素	周超	经管学院	5
34	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4603	农村人口老龄化与农地撂荒：作用机理与应对措施	洪炜杰	经管学院	5
35	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7146	数字平台赋能农业企业组织韧性提升的机制与对策研究	林家宝	经管学院	30
36	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5175	辣木MolAA16基因调控茎端分生组织再生的机理研究	张俊杰	林风学院	10
37	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7178	CmBBX20-CmGID1s-CmDELLAs模块调控菊花成花转化的分子机理	魏倩	林风学院	30
38	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J3407	水稻育性分子遗传调控及种质创新	谢勇尧	农学院	30
39	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J3669	基于新型逆转录酶的植物引导编辑新系统开发	林秋鹏	农学院	30
40	2025年度广州市基础与应用基础研究项目（优秀博士“续航”项目）	2025A04J5440	铜绿假单胞菌CDA群体感应系统调控第二信使c-di-GMP代谢的分子机制研究	徐泽凌	群体微生物研究中心	10
41	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7118	青枯菌第二信使cGAMP信号传导与功能调控	廖立胜	群体微生物研究中心	30
42	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4551	JMJ组蛋白去甲基化酶调控植物发育和胁迫响应的分子机制	贾倩	生命科学学院	5
43	2025年度广州市基础与应用基础研究项目（科技菁英“领航”项目）	2025A04J7117	减数分裂异染色质浓缩和重组抑制的分子机制	王聪	生命科学学院	30
44	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4543	高透明度纳米木质纤维素膜的制备及调控机制	蔡诚	生物质工程研究院	5
45	2025年度广州市基础与应用基础研究项目（青年博士“启航”项目）	2025A04J4471	厚朴酚增效黏菌素抗菌效果的机制研究	任昊	兽医学院	5

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广州市科技计划项目 申报书

项目名称：	数智技术冲击与新企业转向：机制、效应与对策研究
申报单位：	华南农业大学
项目负责人：	蔡文鋆
计划类别：	基础研究计划
专题名称：	2025年度基础与应用基础研究专题
支持方向：	青年博士“启航”项目
组织单位：	华南农业大学
起止时间：	2025-01-01 至 2026-12-31
主管处室：	基础研究处

广州市科学技术局制

二〇二四年

一、基本信息

项目 基本 信息	项目名称	数智技术冲击与新企业转向：机制、效应与对策研究		
	学科领域1	管理综合处-工商管理-创业与中小企业管理-创业管理		
	指南发布日	2024年4月15日		
	申请市级财政 金额	5万元	研究期限	2025年1月1日- 2026年12月31日
项目 摘要	随着数智技术的进步，新企业在高度不确定的环境中如何抓住新技术机遇进行转向，是当前的研究热点。本项目将基于企业注意力视角和事件系统理论，通过定性和定量方法，深入研究数智技术对新企业转向决策的作用机理，主要包括数智技术对新企业转向的多维影响、微观作用机制、转向类型对经济绩效的影响及提升策略。本项目将揭示数智技术冲击下新企业的转向机理，为新企业转向提供理论与实践指导，推动相关理论研究的发展。			

检索证明

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序号	论文名称	发表刊物及发表的年月卷期/页码等	作者排名	论文等级	作者文中单位	收录情况	影响因子	中科院大类分区
1	The effect of corporate social responsibility on open innovation: the moderating role of firm proactiveness	MANAGEMENT DECISION 出版年: 2025 出版日期: NOV 12 卷期: 63 8 页码: 2848-2869 文献类型: Article	第一作者	B 类	华南农业大学 经济管理学院	SSCI	IF2-year=5.1 IF5-year=5.9 (2024)	管理学 3 区 Top 期刊: 否 OA 期刊: 否 (2025)
2	How Does Artificial Intelligence Awareness Impact Employee Attrition: The Roles of Work Anxiety and Self-Efficacy	CANADIAN JOURNAL OF ADMINISTRATIVE SCIENCES- REVUE CANADIENNE DES SCIENCES DE L'ADMINISTRATION 出版年: 2025 出版日期: DEC 卷期: 42 4 页码: 576-590 文献类型: Article	通讯作者	B 类	华南农业大学 经济管理学院	SSCI	IF2-year=0.9 IF5-year=1.5 (2024)	管理学 4 区 Top 期刊: 否 OA 期刊: 否 (2025)
3	How IOS integration enables business model innovation: an empirical study from organisational information	TECHNOLOGY ANALYSIS & STRATEGIC MANAGEMENT 出版年: 2025	通讯作者	B 类	华南农业大学 经济管理学院	SSCI	IF2-year=2.8 IF5-year=3.4 (2024)	管理学 4 区 Top 期刊: 否 OA 期刊: 否

	processing perspective	出版日期: NOV 2 卷期: 37 11 页码: 1263-1277 文献类型: Article						(2025)
4	When differentiated empowering leadership improves team identification and individual work engagement: the combined roles of performance basis, team-member exchange, and employee self-efficacy	CURRENT PSYCHOLOGY 出版年: 2024 出版日期: DEC 卷期: 43 48 页码: 36991-37008 文献类型: Article	通讯作者	B 类	华南农业大学 经济管理学院	SSCI	IF2-year=2.6 IF5-year=2.9 (2024)	心理学 3 区 Top 期刊: 否 OA 期刊: 否 (2025)
5	Determinants of social enterprise performance: The role of passion, competence, and organizational legitimacy	NONPROFIT MANAGEMENT & LEADERSHIP 出版年: 2023 出版日期: JUN 卷期: 33 4 页码: 807-834 文献类型: Article	通讯作者	B 类	华南农业大学 经济管理学院	SSCI	IF2-year=3.2 IF5-year=3.6 (2023)	管理学 3 区 Top 期刊: 否 OA 期刊: 否 (2023)
6	从创造力到绩效: 领导-成员交换与员工情绪智力的作用	科技管理研究 出版年: 2025 卷期: 45 21 页码: 132-141 文献号: 文献类型:	通讯作者	C 类	华南农业大学 经济管理学院	CSSCI	无	无

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The effect of corporate social responsibility on open innovation: the moderating role of firm proactiveness

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Abstract

Purpose – Open innovation (OI) is an effective way to achieve firms' sustainable development in emerging markets. This study aims to investigate the effects of business and philanthropic corporate social responsibility (CSR) on OI and the moderating role of firm proactiveness in such relationships. This study also examines the effects of OI on firms' financial and innovation performance.

Design/methodology/approach – This study uses multisource data from 688 firms in China, including data from surveys of top managers and objective data. The Tobit model, Poisson model, and ordinary least squares regression are adopted to test the hypotheses.

Findings – The results suggest that business CSR and philanthropic CSR both have positive effects on OI. Proactiveness weakens the positive effect of business CSR on OI, while strengthening the effect of philanthropic CSR on OI. The results also show that OI increases firm innovation and financial performance.

Originality/value – CSR enables firms to build wild, deep and trust-based relationships with external actors, which may benefit firms in open search of knowledge. However, it has not received adequate attention in the literature on OI. The findings contribute to the research on OI drivers from the perspective of social activities and enhance the understanding of how different types of CSR and firm proactiveness work together to influence OI.

Keywords Open innovation, Corporate social responsibility, Proactiveness, Performance

Paper type Research paper

Introduction

Open innovation (OI) is an effective way to achieve firms' sustainable development by searching and acquiring knowledge from external sources (Laursen and Salter, 2006). In emerging economies such as China, many firms have shifted from closed internal innovation to OI to catch up with international technological frontiers (Torres de Oliveira *et al.*, 2022). They obtain innovation elements including knowledge, information, and talent, from a wide range of sources through user innovation, supplier involvement, cooperative R&D, strategic alliances, outsourcing, etc (Laursen and Salter, 2006; Chesbrough and Bogers, 2014). For example, *Xiaomi*, the smartphone manufacturer, invites their customers to participate in product innovation and improvement, collecting customer suggestions extensively through the internet and social media. As a famous Chinese appliance manufacturer, *Haier* has established an open innovation platform HOPE, to connect many small and medium enterprises, experts, scholars, and technology enthusiasts to work together on innovation.



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Given the vital role of OI in firms' competitive advantages, a growing number of studies have explored internal and external facilitators of OI, such as empowering leadership, knowledge management capability, and environmental dynamism (Martinez-Conesa *et al.*, 2017; Naqshbandi *et al.*, 2019), whereas few have paid attention to the impact of organization-external interaction on OI. A few studies have noted the importance of interacting with external stakeholders in pooling different knowledge, resources, and reputations that foster OI (Holmes and Smart, 2009; Wang *et al.*, 2022). Some scholars have also found that firms pursuing social goals can obtain the information and support necessary for OI through contact and cooperation with diverse stakeholders (Stephan *et al.*, 2019). However, corporate social responsibility (CSR), which encompasses a series of social activities focused on stakeholders' interests and pursuing social goals (Homburg *et al.*, 2013), has not received adequate attention in the context of OI.

CSR enables firms to build wild, deep and trust-based relationships with different stakeholders, which may benefit firms in the open search for knowledge (Courrent *et al.*, 2018; Han and Lee, 2021; Stephan *et al.*, 2019). Specifically, CSR can be separated into two types: business and philanthropic CSR (Homburg *et al.*, 2013). Business CSR targets stakeholders with direct market exchanges and refers to the ethical obligations in firms' core business operations. Philanthropic CSR focuses on charitable activities and targets stakeholders who do not have direct exchanges with firms. Instrumental stakeholder theory addresses that firms can gain benefits from interactions with stakeholders and has the potential to explain how business and philanthropic CSR help firms acquire resources and legitimacy from stakeholders, which in turn supports open innovation (Jones, 1995; Homburg *et al.*, 2013). Therefore, based on instrumental stakeholder theory, this study explores the effects of business and philanthropic CSR on OI.

In addition, firms often hold multiple goals, caring for stakeholders while pursuing profit maximization (Surroca *et al.*, 2010). Some scholars have noted that firms' social and economic goals have interactive effects on OI (Stephan *et al.*, 2019). Proactiveness is one core facet of entrepreneurial orientation, which aims to identify business opportunities proactively in the pursuit of economic goals (Antoncic and Hisrich, 2001). This study identifies proactiveness as the contingency under which CSR affects OI. Furthermore, in consideration of the difference in targeted stakeholders and acting mechanisms between business and philanthropic CSR, proactiveness may act as a substitute for business CSR and a complementor for philanthropic CSR when they work together to affect OI (Godfrey *et al.*, 2009; Homburg *et al.*, 2013). Therefore, this study supposes that proactiveness moderates the relationship between business and philanthropic CSR and OI in different ways. As a supplement, this study also examines the effects of OI on firms' financial and innovation performance.

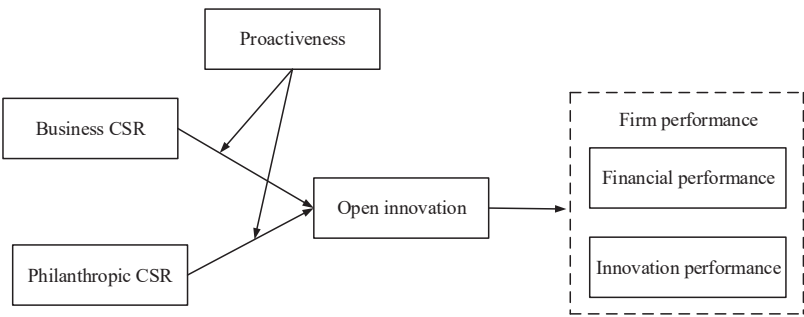
This study makes several contributions. First, given the scarce research attention to the role of social activities in promoting OI (Holmes and Smart, 2009; Stephan *et al.*, 2019), this study investigates the effects of business and philanthropic CSR on OI and enriches the OI literature. Second, by integrating the perspectives of social and economic goals, this research explores the role of firm proactiveness as the contingency under which business and philanthropic CSR influence OI. The present study illustrates how different types of CSR and firm proactiveness work together to influence OI. Finally, we provide practical implications for firms to promote OI in emerging markets. Figure 1 shows the research model.

Literature review and hypotheses

Instrumental stakeholder theory

Stakeholders are defined as a group of individuals or organizations who can affect or are affected by (even potentially) the firm, such as customers, shareholders, employees, suppliers, governments, and community (Freeman and Reed, 1983). The groups of stakeholders can be

Figure 1.
Research model



Source(s): Figure by authors

divided into two types: primary stakeholders and secondary stakeholders (Homburg *et al.*, 2013; Brower and Rowe, 2017). Primary stakeholders are the groups or individuals in direct market exchange with the firm, including customers, shareholders, employees, suppliers, and partners (Homburg *et al.*, 2013). These stakeholders are closely related to the core business operations of firms, and firms cannot survive or operate normally without primary stakeholders. Secondary stakeholders are those who influence or are influenced by the firm but are not engaged in direct transactions with the firm, such as government, the community, and nonprofit organizations (Homburg *et al.*, 2013). They are outside the firm's core business operations. However, they have the power to affect the firm's primary stakeholders (Brower and Rowe, 2017).

Stakeholder theory believes that firms must acknowledge the importance of a variety of stakeholders and account for stakeholders' interests in their business operations (Freeman, 2010). On the ground of stakeholder theory, Jones (1995) developed instrumental stakeholder theory, addressing the organizational performance consequences resulting from consideration of stakeholders' interests. Instrumental stakeholder theory has been adopted to explain how firms achieve financial growth by establishing stakeholder relationships (Surroca *et al.*, 2010; Theodoulidis *et al.*, 2017). It was also connected with the innovation management literature and used to illustrate that maintaining good-quality relationships with stakeholders is beneficial to knowledge acquisition and integration, resulting in the development of innovation capability and innovation performance (Broadstock *et al.*, 2020). In this study, considering that CSR is a form of social activity that concerns stakeholders' interests (Godfrey *et al.*, 2009), instrumental stakeholder theory provides an avenue for understanding the effect of business and philanthropic CSR on OI. We propose that firms taking CSR will respond to the needs of a wide range of stakeholders and improve their relationships with stakeholders to acquire diverse resources and support for OI.

Open innovation

OI refers to the utilization of external knowledge from various sources, which means that firms adopt an open and collaborative approach to achieve innovation (Laursen and Salter, 2006; Chesbrough and Bogers, 2014). The sources of external knowledge are distributed in the environment, including suppliers, consumers, competitors, universities, venture capital enterprises, government, and so on. The increased competitive pressures and dramatically changeable environments stopped firms from relying on internal R&D (Stephan *et al.*, 2019). Chesbrough's (2003) notion of OI also suggested that the locus of firm innovation is transforming from internal R&D to multiorganization engagements. A firm adopting OI can manage knowledge across the boundary between the firm and its surrounding environments

and reduce innovation costs (Chesbrough and Bogers, 2014). OI benefits firms' competitive advantages, value creation, and performance enhancement (Laursen and Salter, 2006; West *et al.*, 2014).

Previous studies have explored a variety of antecedents of OI. Regarding OI external facilitators, scholars have investigated the effects of environmental dynamism (Martinez-Conesa *et al.*, 2017), institutional pressure (Jiao *et al.*, 2022), and institutional innovation systems on OI (Torres de Oliveira *et al.*, 2022). Regarding the internal facilitators of OI, studies have focused on leader-related factors (e.g. empowering leadership, CEO overconfidence; Naqshbandi *et al.*, 2019; Xia *et al.*, 2023), organizational structure (Gentile-Lüdecke *et al.*, 2020), organizational capability (e.g. knowledge management capability, Martinez-Conesa *et al.*, 2017), and organizational strategies (e.g. IT investment, Dong and Netten, 2017). However, there is a lack of research paying attention to the effect of organization-external interactions on OI, although the literature has already pointed out that interacting with different stakeholders is necessary to foster OI. Only a few studies have provided some clues. For instance, Stephan *et al.* (2019) indicated that firms emphasizing social strategic goals are inclined to engage in OI activities. Grama-Vigouroux *et al.* (2020) stressed the effect of stakeholder engagement in implementing OI.

Corporate social responsibility

CSR refers to a firm's voluntary consideration of stakeholders' interests both inside and outside its business operations (Homburg *et al.*, 2013). The voluntary nature of CSR indicates that these social activities benefiting various stakeholders can be regarded as gifts or grants to stakeholder groups (Godfrey *et al.*, 2009). Carroll (1991) proposed the pyramid of CSR and illustrated that CSR contains four kinds of business responsibilities: economic, legal, ethical, and philanthropic, which is widely accepted in the existing research. The four components of CSR can be described as a pyramid. Economic responsibility represents that firms should be profitable; legal responsibility suggests that firms need to meet legal requirements and comply with various regulations; the ethical component requires firms to be consistent with the ethical or moral norms in society; and the philanthropic component includes activities promoting human welfare.

The mainstream literature in the CSR domain emphasized the last two components—ethical and philanthropic responsibilities—and saw them as the essence of CSR (Carroll and Shabana, 2010). Accordingly, in our study, CSR is defined as a series of activities embodying social responsibility that a firm takes voluntarily beyond the economic and legal responsibility to stakeholders (Bocquet *et al.*, 2017; Wang *et al.*, 2022). We distinguished two types of CSR: business CSR and philanthropic CSR. Business CSR corresponds to firms' ethical responsibility and involves activities of securing ethicality in business operations (Homburg *et al.*, 2013; Han and Lee, 2021). The activities include respecting others, avoiding harm to society, protecting the rights of employees, customers, and other stakeholders in business operations, etc. Business CSR targets primary stakeholders who have direct market exchange with the firm and aims to concern the interests of these stakeholders (Homburg *et al.*, 2013; Wang *et al.*, 2022). Philanthropic CSR targets secondary stakeholders who have no direct relationships with the firm and are not involved in the core operations of the firm (Homburg *et al.*, 2013). Philanthropic CSR includes charitable activities for the purpose of doing good deeds and promoting welfare for society voluntarily, for instance, making charitable donations, supporting the development of the local community, and helping vulnerable people (Carroll, 1991; Godfrey *et al.*, 2009).

CSR is proven to have a great influence on firm performance and innovation. Surroca *et al.* (2010) suggested that corporate responsibility influences financial performance by developing intangible resources. Courrent *et al.* (2018) found that CSR is related to the

financial and nonfinancial performance (i.e. customer satisfaction, reputation, employee motivation) of small and medium enterprises. In addition to financial performance, scholars have found that CSR affects innovation. For instance, [Bocquet et al. \(2013\)](#) found that strategic CSR is associated with firms' innovation of products and processes; [Zhou et al. \(2020\)](#) linked the relationship between CSR and innovation through employee involvement and supplier collaboration; and [Wang et al. \(2022\)](#) elucidated that CSR promotes disruptive innovation. In the context of OI, only a few scholars have provided some clues. [Roszkowska-Menkes \(2018\)](#) proposed a theoretical framework that links strategic CSR and OI. [Holmes and Smart \(2009\)](#) adopted case study and found that interacting with non-profit organizations can benefit OI. [Camilleri et al. \(2023\)](#) also provided some theoretical evidence that external stakeholders can assist firms in developing innovation.

Business CSR and OI

Business CSR is targeted at primary stakeholders and reflects the ethical obligations when the firm has exchanges with primary stakeholders ([Brower and Rowe, 2017](#)). According to instrumental stakeholder theory, business CSR helps firms establish good relationships with primary stakeholders, acquire innovation-relevant resources from these stakeholders directly, and increase the involvement of primary stakeholders in OI ([Broadstock et al., 2020](#); [Wang et al., 2022](#)).

First, firms adopting business CSR place great importance on the interests of customers ([Homburg et al., 2013](#)). For example, firms with business CSR will ensure the quality and safety of products, value customer experience and needs, maintain customers' right to information, provide customers with truthful and accurate information, and protect customers' rights. These activities enable firms to establish a good relationship with customers, gain their attention and support, enhance customers' emotional attachment to the firm, and increase their feedback on firms' products, services, processes, and operations ([Courrent et al., 2018](#); [Han and Lee, 2021](#)). Based on customer feedback, firms can improve and innovate their products, services, or processes ([Laursen and Salter, 2006](#)). Additionally, customers are more willing to actively participate in the design and development of products and services ([Zhou et al., 2020](#)). Thus, business CSR can promote open innovation by enhancing customer participation.

Second, when dealing with partners, suppliers, and other upstream and downstream organizations, firms that conduct business CSR will adhere to business ethics, follow the principles of honesty and fairness, disclose reliable information to their partners, avoid harming the interests of stakeholders, and pursue value sharing ([Carroll, 1991](#); [Homburg et al., 2013](#)). These actions help firms gain the trust and respect of these key stakeholders, increase long-term cooperation, and facilitate the establishment of a broad and deep social network ([Roszkowska-Menkes, 2018](#)). Partners, suppliers, and other firms will provide the firm with extensive external knowledge, share core technologies, and promote knowledge transfer, including tacit knowledge ([Roszkowska-Menkes, 2018](#); [Stephan et al., 2019](#)). Thus, business CSR can help firms establish a broad network of cooperation, obtain diverse external knowledge and resources, and promote OI.

Third, firms engaging in business CSR pay attention to the welfare and career development of their employees, protect their rights, and provide better working conditions for them ([Homburg et al., 2013](#)). Such measures promote employees' sense of identity and belonging to the organization, enhance their organizational commitment, and make employees understand and support firm decisions ([Wang et al., 2022](#)). Thus, employees are likely to actively help the firm collect external information, transform, utilize, and develop external knowledge, enhance the company's absorptive capacity, and improve the quality of open innovation ([Courrent et al., 2018](#); [Roszkowska-Menkes, 2018](#)). Therefore, we hypothesize the following:

H1. Business CSR is positively related to OI.

Philanthropic CSR and OI

Research related to instrumental stakeholder theory indicated that firms have to take the needs of secondary stakeholders into consideration if they want to remain competitive and successful (Godfrey *et al.*, 2009; Homburg *et al.*, 2013). Philanthropic CSR is targeted at secondary stakeholders and emphasizes the philanthropic interaction with these stakeholders (Homburg *et al.*, 2013). According to instrumental stakeholder theory, philanthropic CSR helps firms accumulate intangible resources such as legitimacy and reputation from secondary stakeholders, which benefits firms in attracting various social actors to participate in OI (Surroca *et al.*, 2010; Frynas and Yamahaki, 2016).

Specifically, firms engaged in philanthropic CSR make charitable contributions to community and non-profit organizations (Homburg *et al.*, 2013). These charitable activities indicate that firms provide good deeds and welfare for society voluntarily, representing firms' intention to attract stakeholders in an altruistic (other-considering) way (Godfrey *et al.*, 2009; Han and Lee, 2021). Firms often use corporate philanthropy as a tool for acquiring legitimacy (Lanis and Richardson, 2012). Legitimacy is a resource conferred by groups outside the firm, and it refers to the expectations and recognition from various social subjects (Holmes and Smart, 2009; Frynas and Yamahaki, 2016). As a goodwill or altruistic signal, philanthropic CSR plays a critical role in sending messages about the firm's reputation to social actors to reduce their costs of searching and evaluating the firm (Godfrey *et al.*, 2009). In other words, philanthropic CSR helps firms maintain a good image in the community and society, obtaining legitimacy and reputation (Stephan *et al.*, 2019). Based on the acquired legitimacy and reputation, primary stakeholders (e.g. customers, partners, suppliers) will generate high levels of respect and identification for the firm and therefore are willing to promote participation in OI (Surroca *et al.*, 2010; Chesbrough and Bogers, 2014).

Likewise, other social actors such as universities, research institutions, and industry associations are likely to be involved in the OI of the firm because they perceive the firm's reputation and legitimacy (Godfrey *et al.*, 2009; Roszkowska-Menkes, 2018). Thus, based on the reputation and legitimacy generated by charitable giving, the various players in the social network in which the firm is embedded tend to provide more external knowledge and resources to the firm to promote open innovation (Stephan *et al.*, 2019).

In addition, firms practicing philanthropic CSR make donations to support disadvantaged groups and improve the environment and living conditions of local communities (Carroll, 1991). They can therefore help the government promote public welfare, solve social problems, and gain goodwill and feedback from the government (Godfrey *et al.*, 2009; Frynas and Yamahaki, 2016). The government may provide more opportunities and resources for the firm, including direct government involvement in OI and providing technology, knowledge and talent support for the firm's innovation (Laursen and Salter, 2006; Chesbrough and Bogers, 2014). Moreover, the government can provide information support for firms with philanthropic CSR. The government may release information about corporate donations to society through media and internet channels to enhance the legitimacy of the firm, which will contribute to attracting a wide range of social agents to participate in the OI of the firm (Godfrey *et al.*, 2009; Homburg *et al.*, 2013). Therefore, we hypothesize the following:

H2. Philanthropic CSR is positively related to OI.

The moderating effect of proactiveness

Proactiveness refers to the initiative of firms to search and identify new opportunities in the market, including scanning the market and industry environment, predicting market

changes and consumer demands to change and shape the environment, and taking action before competitors (Antonic and Hisrich, 2001; Kreiser *et al.*, 2010). As one of the dimensions in entrepreneurial orientation, proactiveness is an aggressive and bold strategic action that pursues economic goals (Antonic and Hisrich, 2001). Firms with high levels of proactiveness think they can set “rules of the game” in the industry (Kreiser *et al.*, 2013, p. 277). They will actively approach customers, suppliers, partners, and other players in the market, build relationships with these key stakeholders through communication, and seek potential business opportunities with the aim of improving profitability (Dai *et al.*, 2014). Therefore, proactiveness targets primary stakeholders who have direct market exchanges with the firm in the business environment.

We propose that proactiveness weakens the effect of business CSR on OI. First, proactiveness reduces a firm’s dependence on business CSR. Business CSR aims to benefit primary stakeholders (Homburg *et al.*, 2013). By caring about the interests of primary stakeholders, firms obtain opportunities and resources from primary stakeholders to support OI (Wang *et al.*, 2022). Proactiveness also targets the firm’s primary stakeholders. Firms with proactiveness put effort into building relationships with various stakeholders in the market and collecting a range of resources to support OI (Dai *et al.*, 2014). It can be seen that proactiveness and business CSR have similar targets and purposes. Therefore, the roles of proactiveness and business CSR for OI are substitutes for each other. Firms with proactiveness will have lower expectations of business CSR and rely less on business CSR to bring in external innovation-related resources (Kreiser *et al.*, 2013). Conversely, firms with low proactiveness are more dependent on business CSR because they have limited options to obtain resources. Due to the limitation of channels to build relationships and obtain resources, firms are more likely to depend on the goodwill and support of primary stakeholders by complying with ethics and doing good in their business operations to obtain resources and promote OI (Roszkowska-Menkes, 2018; Stephan *et al.*, 2019).

Second, proactiveness may undermine the favor and recognition from primary stakeholders generated by business CSR. Although business CSR demonstrates that a company is not purely self-interested but at least partially altruistic, it may be perceived by external stakeholders as a means of exchanging power (Godfrey *et al.*, 2009). Because primary stakeholders are closely related to the daily operations of the firm, they are able to make legitimate demands on the firm and its managers and have the urgency and power to enforce these demands (Mitchell *et al.*, 1997). Therefore, business CSR can be interpreted in terms of power exchange in addition to being seen as an altruistic behavior. Proactiveness may expose the intention of the firm to pursue economic goals in front of primary stakeholders and create an impression of self-interest for them (Kreiser *et al.*, 2013). It may cause primary stakeholders to perceive business CSR as merely self-serving, rather than altruistic, behaviors for profit-making, thus weakening stakeholders’ favorable perception of the firm due to business CSR (Godfrey *et al.*, 2009). Therefore, we have the following hypothesis:

H3. Firms’ proactiveness negatively moderates the relationship between business CSR and OI.

We propose that proactiveness strengthens the effect of philanthropic CSR on OI. First, philanthropic CSR and proactiveness play complementary roles in promoting OI. Philanthropic CSR addresses the interests of secondary stakeholders, who do not directly provide resources and opportunities for OI to the firm (Homburg *et al.*, 2013). Instead, they can provide legitimacy to the firm and help the firm gain broad social recognition (Holmes and Smart, 2009). Unlike primary stakeholders, secondary stakeholders lack the urgency and power to press their claims on the firm (Mitchell *et al.*, 1997). Therefore, philanthropic CSR will not be seen as a purely self-interested action taken by the firm and its managers but more likely to be viewed as a completely voluntary altruistic behavior of the firm (Godfrey *et al.*, 2009). Proactive firms need

reputation and legitimacy in the process of searching for business opportunities (Kreiser *et al.*, 2010). The reputation and legitimacy brought by philanthropic CSR can help firms convey altruistic signals about themselves in communication and negotiation with external actors, persuade primary stakeholders to join the collaboration, and enhance their willingness to provide resources and support for OI (Holmes and Smart, 2009; Frynas and Yamahaki, 2016). Therefore, compared to firms without proactiveness, those with proactiveness rely more on philanthropic CSR to increase the probability of success in obtaining external resources and opportunities.

In addition, even under the best circumstances, business activities can cause more or less negative impacts on some stakeholders. Proactiveness is an aggressive strategic action with high uncertainty and risks, and it conveys a signal of pursuing economic goals (Antoncic and Hisrich, 2001). This may allow primary stakeholders to reinforce the impression that the firm is seeking profit maximization and may offend some key stakeholders (Kreiser *et al.*, 2013). Philanthropic CSR can create “moral capital” for firms, helping them to have a buffer when facing negative comments (Godfrey *et al.*, 2009, p. 427). When firms have high levels of proactiveness, they have a greater demand for the friendly signal and moral capital brought by philanthropic CSR, as these signals and moral capital can act as insurance for the firm and mitigate the negative outcomes resulting from proactiveness (Godfrey *et al.*, 2009; Kreiser *et al.*, 2010). Therefore, we have the following hypothesis:

- H4. Firms’ proactiveness positively moderates the relationship between philanthropic CSR and OI.

OI and performance

Considering that organizational performance is the most important indicator to examine whether OI is effective and beneficial to the firm, we also examine the effects of OI on firms’ innovation and financial performance. Prior literature has provided evidence to support the positive relationship between OI and innovation performance (Laursen and Salter, 2006; Cheng and Huizingh, 2014; Greco *et al.*, 2016). OI allows firms to collect innovation-relevant resources and knowledge from various groups of stakeholders. Embedded in such a rich-knowledge network, firms are likely to create more new combinations of knowledge and technologies and have more opportunities to draw external ideas into the development of new products, services, or processes (Laursen and Salter, 2006). Thus, we hypothesize that OI has a positive effect on innovation performance. We also suppose that OI leads to greater financial performance. By using knowledge from various external sources, firms can exploit their technologies and commercialize innovative ideas more easily (Noh, 2015). With the involvement of different stakeholders in OI, new products will be widely recognized, and firms can achieve higher financial revenues from collaborative R&D. Furthermore, when firms adopt OI, greater efficiency and lower costs for innovation are generated, and firms have a higher possibility of translating new offerings into superior economic rewards (Sisodiya *et al.*, 2013). Therefore, we hypothesize the following:

- H5. OI has a positive effect on firms’ (a) innovation performance and (b) financial performance.

Methods

This study used multisource data that included survey data from the top managers of each firm and objective data from the government system. The sample firms in this study are located in the Yangtze River Delta, which is the largest economic area in China. We cooperated with a local government agency responsible for improving the development of

local firms and industries. Through the assistance of the government agency, we obtained a list of approximately 1,200 firms and contacted them via email or telephone. Our research data were collected in two waves. In Wave 1, we collected the survey data. For each firm, we invited the chief operating officer (COO) to answer the questionnaires on business and philanthropic CSR because COOs have a macro perspective of organizational operations. To avoid the potential bias of a single informant, we invited the R&D managers to answer the questions of OI and proactiveness given that they are the most familiar with firm innovation. We made follow-up phone calls after one week to remind these top executives. After matching the responses from 1,066 COOs and 801 R&D managers, we obtained 688 complete and useful questionnaires at the firm level.

At the end of the year, in Wave 2, we contacted the government agency again and obtained the objective data for the whole year from the government system. The government agency collects firms' annual performance data including sales, profits, assets, and number of patents, every year. We also obtained descriptive information such as firm age, firm size, and industry affiliation from this system. The final sample of this study is 688 firms, with a response rate of 57.33%. To test the non-response bias, we examine the differences in the descriptive information between respondents and non-respondents. The results of a *t*-test showed no significant difference ($p > 0.05$) between the two groups, indicating that non-response bias is not a concern in our study. [Table 1](#) presents the sample demographic information.

Measures

Business and philanthropic CSR. We used the well-established scale developed by [Homburg et al. \(2013\)](#) to measure business and philanthropic CSR. Business CSR was measured by 5 items such as "Our company provides full and accurate information to all its customers." Philanthropic CSR was assessed by 4 four items. One sample item is "Our company is involved in corporate giving." All items were scored on a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The complete measurement items are shown in the [Appendix](#).

	Frequency	Percent (%)
<i>Industry</i>		
Food	79	11.48
Petroleum and chemicals	97	14.10
Metal and non-metal	67	9.74
Automotive and machinery	265	38.52
Telecommunication and IT	62	9.01
Biotechnology and medicine	47	6.83
Other	71	10.32
<i>Firm age</i>		
<=10	251	36.48
11–15	233	33.87
16–20	139	20.20
>20	65	9.45
<i>Number of employees (firm size)</i>		
<=100	258	37.50
101–300	280	40.70
301–500	83	12.06
>500	67	9.74

Table 1.
Sample
demographic (*N* = 688)

Source(s): Table by authors

Proactiveness. To measure firms' proactiveness, we adopted the 5-item scale from research of [Antonic and Hisrich \(2001\)](#). Example items include "Our company adopts an 'undo-the-competitors' posture." All items were scored on a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Open innovation. In this study, OI was measured by a 13-item scale from the research of [Laursen and Salter \(2006\)](#). In the questionnaire, we listed 13 sources of knowledge or information for innovation: suppliers, consumers, dealers, competitors, consultants, universities and other research institutions, technology intermediary organization, intellectual property organization, venture capital enterprises, news media, trade associations, relevant government departments, and others. First, respondents were asked to indicate on a 5-point scale (1 = "very low", 5 = "very high") of the extent to which the firm searched for knowledge and information from external sources for their firm's innovation activities. Then, we recoded each item as a binary value. When the response of each item was 4 or 5, the item was given a new value of 1, suggesting that the firm cooperated deeply with one of the 13 external sources. Otherwise, the new value is 0. Next, the new values were summed for each firm as the final score of OI. This variable ranges from 0 to 13, with 0 representing a relatively closed innovation and 13 indicating a high level of open innovation.

Financial and innovation performance. Firms' financial performance was captured by the sales growth rate in a given year (t): $(\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$, which is widely accepted in previous research ([Ling et al., 2008](#); [Zheng et al., 2015](#)). Innovation performance was measured by the number of patent applications in a given year. Scholars have recognized patent counts as a good proxy for innovation, as they offer rich information and correlate closely with other innovation outcomes such as the number of new products ([Yanadori and Cui, 2013](#)).

Control variables. We controlled for firm age, firm size, firm leverage, industry classification, and environmental dynamism, all of which may affect open innovation and firm performance. Firm age was the operating years since the firm was established to the year in which we collected data. Firm size was measured as the natural logarithm of employee numbers of each firm. Firm leverage was the ratio of debt to assets ([Li and Tang, 2010](#)). Industry classification was controlled by six dummy variables to represent the food, petroleum and chemicals, metal and non-metal, automotive and machinery, telecommunication and IT, biotechnology and medicine industries, with other industries as the baseline group. To control the effect of environmental conditions on firm outcome, we regressed the industry's annual sales over a 5-year period and measured environmental dynamism by the standard error of the regression slope coefficient ([Boyd, 1990](#)).

Results

Reliability and validity

As [Table 2](#) shows, the Cronbach's alpha and composite reliability (CR) of each construct surpass the threshold value of 0.70 ([Fornell and Larcker, 1981](#)), which suggests high internal reliability. We also conducted confirmatory factor analysis (CFA). The results indicate a good reliability and validity of our measurement model ($\chi^2 = 1,142.46$, $df = 318$, $CFI = 0.93$, $TLI = 0.92$, $RMR = 0.02$, $RMSEA = 0.06$). For each construct, the indicator factor loading surpasses 0.50. The average variance extracted (AVE) reflects the variance captured by the construct, which is a more conservative measure to assess validity ([Fornell and Larcker, 1981](#); [Lam, 2012](#)). The AVE value of most constructs in the proposed model exceeds the threshold of 0.50. Additionally, as [Table 3](#) suggests, the square roots of AVE of every construct are larger than its correlations with any other construct. Therefore, we can comprehensively consider that the measurement of this study has adequate reliability and validity.

MD
63,8

2858

		Item	Loading	Alpha	AVE	CR
	BCSR	BCSR1	0.91	0.94	0.81	0.96
		BCSR2	0.92			
		BCSR3	0.93			
		BCSR4	0.93			
		BCSR5	0.80			
	PCSR	PCSR1	0.86	0.90	0.78	0.93
		PCSR2	0.89			
		PCSR3	0.88			
		PCSR4	0.89			
	Proactiveness	PRO1	0.73	0.86	0.65	0.90
		PRO2	0.74			
		PRO3	0.82			
		PRO4	0.86			
		PRO5	0.86			
	OI	OI1	0.59	0.89	0.44	0.91
		OI2	0.56			
		OI3	0.59			
		OI4	0.65			
		OI5	0.64			
		OI6	0.54			
		OI7	0.70			
		OI8	0.71			
		OI9	0.75			
		OI10	0.71			
		OI11	0.71			
		OI12	0.69			
		OI13	0.74			

Table 2.
Measurements

Source(s): Table by authors

Common method bias

To minimize common method bias, we collected data from multiple sources, including firms' COOs, R&D managers, and firms' objective performance data. Additionally, we adopted two methods to evaluate the risk of common method bias. First, similar to previous research (Kammerlander *et al.*, 2015), we conducted a confirmatory factor analysis and compared the fit indices between the one-factor model and measurement model with constructs. We found that the model fit of our measurement model ($\chi^2 = 1142.46$, $df = 318$, $CFI = 0.93$, $TLI = 0.92$, $RMR = 0.02$, $RMSEA = 0.06$) was significantly better than the model with only one factor ($\chi^2 = 7244.36$, $df = 328$, $CFI = 0.37$, $TLI = 0.33$, $RMR = 0.09$, $RMSEA = 0.18$), indicating the absence of common method bias. Second, following Lindell and Whitney (2001), we conducted the method variance (MV) marker method to assess common method bias. We selected a single-item variable (i.e. COO gender) as an MV marker that is theoretically unrelated to at least one of our constructs. The lowest positive correlation ($r = 0.02$, with financial performance) between the MV marker and other constructs was used to adjust the construct correlations. In Table 3, the comparison of the correlations among the main variables above and below the diagonal suggested that all significant correlations remained significant after adjustment. Thus, common method bias is not a problem in our study.

Hypothesis testing

All data analysis was performed using Stata 16 software. Considering that OI is a count variable that ranges from 0 to 13, we applied a Tobit regression model to examine the

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.BCSR	(0.90)	0.62*	0.40*	0.24*	0.02	0.08*								
2.PCSR	0.63*	(0.88)	0.37*	0.31*	0.04	0.04								
3.Proactiveness	0.41*	0.38*	(0.81)	0.44*	0.06	0.00								
4.OI	0.26*	0.32*	0.45*	(0.66)	0.08*	0.02								
5.Financial performance	0.04	0.06	0.08*	0.09*	—	0.00								
6.Innovation performance	0.10*	0.06	0.02	0.04	0.02	—								
7.Industry	0.04	0.01	0.06	0.06	0.00	0.02	—							
8.Firm size	0.05	0.10*	0.07	0.04	0.05	0.15*	0.13*							
9.Firm age	0.01	0.04	0.04	0.00	0.02	0.02	0.05	—						
10.Leverage	0.00	0.01	0.05	0.02	0.01	—0.06	0.06	0.07	—					
11.Dynamism	0.02	0.00	0.02	0.05	0.05	0.03	0.10*	—0.04	0.00	—				
12.Relation training ^a	0.56*	0.50*	0.40*	0.31*	0.05	0.05	0.06	0.05	0.01	—0.07	0.00			
13.Procedural justice ^a	0.63*	0.55*	0.44*	0.34*	0.05	0.03	0.06	0.04	0.00	0.00	0.02	0.65*		
14.COO gender (MV marker)	0.06	—0.02	0.02	0.04	0.02	0.03	0.10*	—0.14*	—0.02	0.01	0.04	0.05	0.02	—
Mean	4.34	4.12	4.05	7.22	16.81	9.02	3.81	4.98	13.22	0.49	1.02	3.89	4.10	1.26
SD	0.53	0.62	0.57	4.10	63.57	14.22	1.72	0.92	5.65	0.30	0.01	0.67	0.55	0.44
Min	3	1.75	1	0	—100	0	1	2.48	3	0	1.00	1	2.33	1
Max	5	5	5	13	1029.44	183	7	8.13	66	5.05	1.13	5	5	2
Note(s): <i>N</i> = 688; * <i>p</i> < 0.05														
The diagonal elements (i.e. values in brackets) are the square roots of AVEs of the main variables in our model. Unadjusted correlations are below the diagonal; correlations adjusted for the common method are above the diagonal														
^a Variables used as instruments for endogeneity test														
Industry is combined by six industry dummy variables to make the table concise (1 = food, 2 = petroleum and chemicals, 3 = metal and non-metal, 4 = automotive and machinery, 5 = telecommunication and IT, 6 = biotechnology and medicine, 7 = others)														
Source(s): Table by authors														

Table 3.
Means, standard
deviations, and
correlations

relationship between CSR and OI (Keupp and Gassmann, 2009). The results of the regression analysis are shown in Table 4. Model 1 only includes the effects of control variables on OI. Model 2 presents the effect of CSR on OI, suggesting that both business CSR ($\beta = 0.79$, $p < 0.05$) and philanthropic CSR ($\beta = 1.72$, $p < 0.001$) are positively related to OI, which supports Hypotheses 1 and 2. In Model 3, the moderator is added into the regression. Hypotheses 3 and 4 predict the moderating role of proactiveness in the relationship between CSR and OI. The estimation results of Model 4 indicate that proactiveness negatively moderates the relationship between business CSR and OI ($\beta = -0.59$, $p < 0.01$), while positively moderating the relationship between philanthropic CSR and OI ($\beta = 0.36$, $p < 0.05$). Thus, Hypotheses 3 and 4 received support.

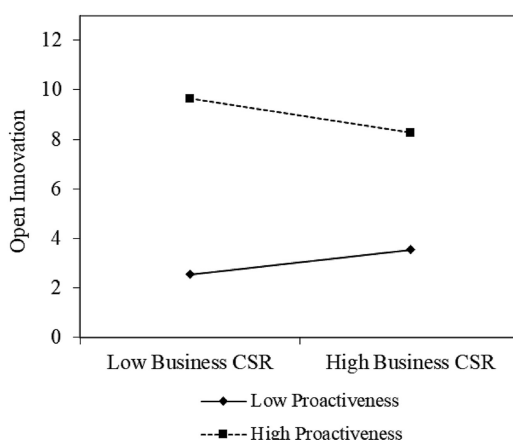
To provide further support for the moderating effect of proactiveness, we plotted slopes in Figures 2 and 3, by setting the low levels of proactiveness as minus one standard deviation from the mean and the high levels of proactiveness as one deviation above the mean. As suggested in Figure 2, compared to low levels of proactiveness, the effect of business CSR on OI is weaker at high levels of proactiveness, which supports Hypothesis 3. Figure 3 shows that when proactiveness is high rather than low, philanthropic CSR has a stronger positive effect on OI, thus providing support for Hypothesis 4.

Hypotheses 5a and 5b predict the effect of OI on firm innovation and financial performance. To test the effects of OI on innovation performance, we adopted the Poisson model because the number of patent applications is a count variable with nonnegative integer values (Kim et al., 2016; Jia et al., 2019). The results of Model 6 in Table 5 suggest that OI is positively related to innovation performance ($\beta = 0.02$, $p < 0.001$), which supports Hypothesis 5a. When examining the effect of OI on financial performance, we used ordinary least squares (OLS) regression in Models 7 and 8 of Table 5. The results of Model 8 indicate that OI is positively associated with financial performance ($\beta = 1.44$, $p < 0.05$), supporting Hypothesis 5b.

Dependent variables	Open innovation (Tobit)							
	Model 1		Model 2		Model 3		Model 4	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Industry1	-0.82	0.74	-0.71	0.71	-0.28	0.66	-0.42	0.65
Industry2	-0.76	0.69	-0.47	0.66	-0.26	0.61	-0.32	0.61
Industry3	-1.44*	0.73	-1.16	0.70	-1.02	0.65	-1.17	0.64
Industry4	-1.52*	0.59	-0.98	0.57	-0.82	0.53	-0.93	0.53
Industry5	-0.59	0.76	-0.04	0.73	0.17	0.68	0.10	0.68
Industry6	-0.52	0.87	-0.41	0.82	-0.14	0.76	-0.27	0.76
Firm size	0.18	0.18	0.05	0.17	0.02	0.16	-0.01	0.16
Firm age	0.00	0.03	-0.01	0.03	-0.01	0.03	-0.01	0.03
Leverage	0.27	0.55	0.25	0.52	0.04	0.48	0.10	0.48
Environment dynamism	15.82	14.36	16.23	13.62	17.27	12.63	16.71	12.56
Business CSR (BCSR)			0.79*	0.38	-0.08	0.36	-0.09	0.36
Philanthropic CSR (PCSR)			1.72***	0.33	1.17***	0.31	1.17***	0.31
Proactiveness					2.93***	0.28	2.96***	0.29
BCSR*Proactiveness							-0.59**	0.18
PCSR*Proactiveness							0.36*	0.18
Observations	688		688		688		688	
Log likelihood	-1914.37		-1878.20		-1828.70		-1823.51	

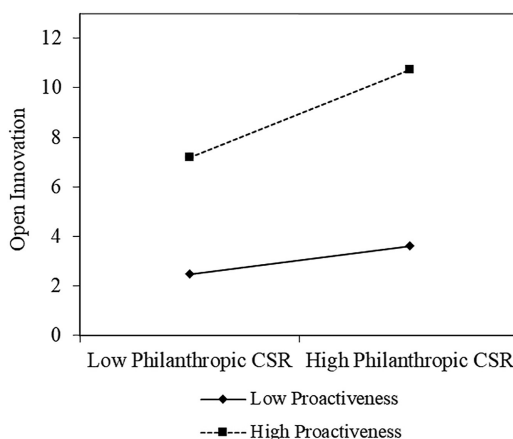
Table 4.
Estimation results for
open innovation

Note(s): * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. *B* is the unstandardized coefficient; S.E. is the standard error
Source(s): Table by authors



Source(s): Figure by authors

Figure 2.
The moderating effect
of proactiveness on the
relationship between
business CSR and OI



Source(s): Figure by authors

Figure 3.
The moderating effect
of proactiveness on the
relationship between
philanthropic CSR
and OI

Endogeneity

Considering that the CSR and OI data were collected at the same time, we conducted a two-stage least squares (2SLS) model testing for potential endogeneity in the relationship between CSR and OI. Given that we have two independent variables in our model, we performed the 2SLS estimation procedures with two instrumental variables that are significantly related to independent variables but not closely related to the dependent variable (Hamilton and Nickerson, 2003). Relation training refers to the training for employees to build work-related interpersonal relationships with internal and external stakeholders (Wood and de Menezes, 2008), which we identified as the instrument of business CSR. Procedural justice is the perceived equity of members in top management teams on task assignments, compensation, performance evaluation, and promotion criteria (Paré *et al.*, 2000). We used it as the instrumental variable of philanthropic CSR. The two instrumental variables are answered by COOs. The measurement items are shown in the Appendix.

Table 5.
Estimation results for
performance

Dependent variables	Innovation performance (Poisson)				Financial performance (OLS)			
	Model 5		Model 6		Model 7		Model 8	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Industry1	-0.40***	0.07	-0.39***	0.00	-4.89	11.04	-3.71	11.01
Industry2	0.31***	0.05	0.33***	0.07	12.67	10.31	13.81	10.28
Industry3	0.01	0.06	0.04	0.05	8.03	10.88	9.97	10.87
Industry4	0.33***	0.05	0.36***	0.06	6.19	8.83	8.29	8.85
Industry5	0.27***	0.06	0.28***	0.05	-5.19	11.39	-4.22	11.35
Industry6	-0.45***	0.08	-0.44***	0.06	5.22	12.88	6.02	12.84
Firm size	0.29***	0.01	0.28***	0.08	3.83	2.71	3.58	2.70
Firm age	0.00	0.00	0.00	0.01	0.05	0.44	0.05	0.44
Leverage	-0.50***	0.05	-0.51***	0.00	2.70	8.17	2.34	8.15
Environment dynamism	2.29*	1.06	1.96	0.05	193.24	213.40	172.45	212.81
Open innovation			0.02***	1.05			1.44*	0.60
Observations	688		688		688		688	
Log likelihood	-5541.76		-5527.88		-		-	

Note(s): * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. B is the unstandardized coefficient; SE is the standard error
Source(s): Table by authors

The results of 2SLS estimations are presented in Table 6. In the first stage, business CSR and philanthropic CSR were regressed separately on control variables and instrumental variables. In Model 1 of Table 6, relation training is significantly and positively related to business CSR ($\beta = 0.45, p < 0.001$), indicating that relation training is a valid instrument for business CSR. Similarly, in Model 2, procedural justice is found to be positively associated with philanthropic CSR ($\beta = 0.62, p < 0.001$), which supports perceived justice as a valid instrument for philanthropic CSR.

Table 6.
2SLS model testing for
endogeneity

Dependent variables	Business CSR Model 1 (OLS)	Philanthropic CSR Model 2 (OLS)	Open innovation Model 3 (tobit)
Industry1	0.00	0.09	-0.56
Industry2	0.03	-0.10	-0.18
Industry3	0.02	-0.08	-0.91
Industry4	0.02	-0.16*	-0.48
Industry5	0.07	-0.16	0.44
Industry6	-0.03	-0.05	-0.27
Firm size	0.01	0.05*	-0.07
Firm age	0.00	0.00	-0.01
Leverage	0.07	0.01	0.25
Environment dynamism	0.54	-0.48	16.24
Relation training	0.45***		
Procedural justice		0.62***	
Business CSR			2.14**
Philanthropic CSR			3.06***
Observations	688	688	688
Log likelihood	-	-	-1868.34
R ²	0.32	0.33	-
F	28.31***	30.32***	-

Note(s): ** $p < 0.01$; *** $p < 0.001$
Source(s): Table by authors

Then, in the second stage, we replaced the values of business and philanthropic CSR with their predicted values, which were obtained in the first stage. In Model 3 of Table 6, OI was regressed on all control variables and the predicted values of business and philanthropic CSR. The results suggest that the predicted values of business CSR ($\beta = 2.14, p < 0.01$) and philanthropic CSR ($\beta = 3.06, p < 0.001$) are positively and significantly correlated with OI. These findings are consistent with our original results in Table 4. Thus, endogeneity issues are not a serious concern in our study.

Discussion

OI has been widely recognized as a tool for firms to collaborate extensively on innovation across organizational boundaries (Chesbrough and Bogers, 2014). The present study incorporates instrumental stakeholder theory to explain how different types of CSR promote OI. This study finds that both business and philanthropic CSR facilitate OI. Proactiveness negatively moderates the effect of business CSR on OI, but positively moderates the effect of philanthropic CSR on OI. The results also suggest that OI increases firm innovation and financial performance.

This study makes several contributions. First, this study enriches the literature on OI by revealing the effects of business and philanthropic CSR. Previous research on OI drivers has paid close attention to factors within and outside the organization. The internal factors include leader personality, leadership, organizational capabilities, and organizational strategies (Dong and Netten, 2017; Naqshbandi *et al.*, 2019; Xia *et al.*, 2023), and the external factors involve characteristics of the market and institutional environment (Martinez-Conesa *et al.*, 2017; Jiao *et al.*, 2022). However, the literature has neglected the role of firm-stakeholder interactions in promoting OI. Only a few studies have proposed that the pursuit of social goals, such as CSR implementation, inspires firms to participate in external collaboration, pool extensive knowledge, and benefit OI (Stephan *et al.*, 2019). The present study provides evidence for these studies and suggests that CSR can help firms gather extensive resources, reputation, and legitimacy through interactions with diverse stakeholders, ultimately promoting OI.

Second, this study extends the application of instrumental stakeholder theory in the context of OI. Stakeholder theory has emerged as a dominant paradigm in the realm of CSR (Freeman, 2010). Research related to stakeholder theory has primarily focused on what factors drive firms to adopt CSR (Frynas and Yamahaki, 2016). As a branch of stakeholder theory, instrumental stakeholder theory stresses the organizational performance consequences generated from firm-stakeholder relationships, and it has been used to illustrate how CSR activities are converted into business objectives (Jones, 1995). In the existing research, instrumental stakeholder theory has provided a lens to explain the effect of CSR on firms' economic returns, innovation performance, customer loyalty, or disruptive innovation (Homburg *et al.*, 2013; Theodoulidis *et al.*, 2017; Broadstock *et al.*, 2020; Wang *et al.*, 2022). This study illuminated that CSR is instrumental in obtaining a wide range of resources from stakeholders to support a special type of innovation—OI, which contributes to the literature on instrumental stakeholder theory.

Third, this study adds value to CSR research. By investigating the positive relationship between CSR and OI, the results of the present paper support the view that CSR is a win-win strategy for firms and stakeholders that not only meets the needs of stakeholders but also brings economic rewards to firms (Wang *et al.*, 2022). Our findings also advance the understanding of the differences between business and philanthropic CSR. Many previous studies have not distinguished between CSR types or hold that both business and philanthropic CSR lead to corporate image and reputation (e.g. Surroca *et al.*, 2010; Han and Lee, 2021). Unlike these studies, Godfrey *et al.* (2009) identified the distinction between the two types of CSR and

declared that business CSR may sometimes be seen as a self-serving action from the perspective of power exchange, but philanthropic CSR is always regarded as a completely altruistic behavior. We provide support for the view of [Godfrey et al. \(2009\)](#) in two ways. First, we argued that business and philanthropic CSR have different mechanisms in stimulating OI based on their distinct objectives and practice engagement. Business CSR targets primary stakeholders and benefits firms in gaining direct access to innovation resources, while philanthropic CSR targets secondary stakeholders who do not provide OI resources directly but can increase organizational legitimacy and reputation for OI ([Homburg et al., 2013](#)). Then, we supported the possible differentiated stakeholders' interpretations of the two CSR types. We found that the direct access to innovation resources from primary stakeholders brought by business CSR can be dampened by firm proactiveness, whereas the legitimacy and reputation generated by philanthropic CSR act as a complement to proactiveness.

In addition, this study offers new insight into the contingency of the relationship between CSR and OI by examining the moderating role of proactiveness. Past research has mainly focused on the external boundary conditions under which CSR affects organizational outcomes, such as environmental turbulence and competition intensity ([Homburg et al., 2013](#); [Wang et al., 2022](#)), rarely noting the contingencies within the organization. Only [Theodoulidis et al. \(2017\)](#) found the interactive effect of CSR and firm strategy (e.g. differentiation and cost efficiency) on financial performance. The present study echoes this view and finds that proactiveness as an aggressive strategy firms adopt to search for new opportunities, influences the relationship between CSR and OI.

Finally, our findings contribute to the literature on goal multiplicity in commercial firms. Some research has contended that there exists a conflict between firms' social and economic goals, while others have argued that the two strategic goals are complementary and that firms achieve OI benefit most when social goals align with economic goals ([Stephan et al., 2019](#)). Our study combines and extends the two conflicting viewpoints. As a strategy to pursue economic goals, proactiveness dampens the effect of business CSR on OI but strengthens the effect of philanthropic CSR and OI. The opposite moderating effects of proactiveness stem from the distinctive targeted stakeholders between business and philanthropic CSR ([Godfrey et al., 2009](#)). The overlapping objectives of proactiveness and business CSR reduce the effectiveness of business CSR in promoting OI. The results provide theoretical implications for future research that when analyzing whether the pursuit of economic and social goals can produce synergies, we need to distinguish between specific stakeholder groups where social goals work.

Practical implications

This study also provides practical implications. First, the results indicate that both business and philanthropic CSR are positively associated with OI. To promote OI, firms should consider stakeholders' interests and interact actively with them. By meeting the needs of primary and secondary stakeholders through CSR practice engagement, firms can acquire the necessary resources and knowledge for OI. Second, we found that proactiveness weakens the effect of business CSR on OI while reinforcing the link between philanthropic CSR and OI. When firms adopt proactive, aggressive, and bold strategies to search for business opportunities in the environment, business CSR may be viewed as a self-serving means of exchanging power from primary stakeholders, while philanthropic CSR represents a pure signal of friendliness and altruism from the firm. Philanthropic CSR provides the necessary legitimacy and reputation for proactiveness and can serve as a kind of insurance when firms receive negative comments due to proactive strategies, maintaining a good image for the firm, while business CSR cannot. Therefore, when implementing proactive strategies, enterprises should pay more attention to the role of philanthropic CSR in OI.

Limitations and future research

Several limitations of this study indicate directions of future research. First, most of our sample comes from the manufacturing industry. Different industries hold different characteristics in CSR practice engagement and OI implementation. Future research can incorporate more industries and compare the differences between industries such as the service and manufacturing industries. Second, this empirical work is conducted only in China. We expect future research to consider other emerging markets and generalize our conclusions into other country contexts. Third, although we collect data from multiple sources, we measure CSR and OI using a survey, which may be influenced by the personal bias of respondents. To reduce this bias, future studies could use objective data to represent CSR and OI. Fourth, we evaluated financial performance using sales growth. Future studies may incorporate more indicators of performance such as profitability and ROA. Finally, we only examine the moderating role of proactiveness in the link between CSR and OI. Scholars in future research can consider more types of firm strategies as contingencies, such as diversification and dynamic competition strategy.

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Appendix

Business CSR

- 1. Our company follows employee-friendly rules and policies
- 2. Our company provides working conditions that safeguard the health and safety of its employees
- 3. Our company provides full and accurate information to all its customers
- 4. Our company follows high ethical standards in its business operations
- 5. Our company respects customer rights beyond the legal requirements

Philanthropic CSR

- 1. Our company gives back to the communities in which it does business
- 2. Our company integrates charitable contributions into its business activities
- 3. Local nonprofits benefit from our company's contributions
- 4. Our company is involved in corporate giving

Proactiveness

- 1. Our company is active in introducing new techniques, including being the first to introduce new products, services, administrative techniques, operating technologies etc.
- 2. Our company adopts an "undo-the-competitors" posture
- 3. Our company has a risk-taking proclivity
- 4. Our company takes bold, wide-ranging acts to achieve objectives
- 5. Our company adopts a bold, aggressive decision-making style

Open innovation

To evaluate the extent to which the firm searched for knowledge and information from external sources (from 1 = "very low" to 5 = "very high")

- (1) Suppliers
- (2) Consumers

Table A1.
Measurement items

(continued)

-
- (3) Dealers
 - (4) Competitors
 - (5) Consultants
 - (6) Universities and other research institutions
 - (7) Technology intermediary organization
 - (8) Intellectual property organization
 - (9) Venture capital enterprises
 - (10) News media
 - (11) Trade associations
 - (12) Relevant government departments
 - (13) Others

Relation training (Instrument)

1. Our company provides adequate expenses for employees to develop work-related interpersonal relationship
2. Our company trains employees to establish personal relationships with major internal stakeholders
3. Our company assesses employee's ability to build relationships with other employees in different areas of the company
4. Employees often discuss the strategies to develop personal relationships with major external stakeholders
5. Our company provides financial incentives for employees to promote work-related personal relationships
6. Our company assesses employee's ability to build relationships with major external stakeholders
7. Our company motivates employees to develop work-related personal relationships with internal stakeholders
8. Employees coach each other on how to build work-related personal relationships with other employees in the company

Procedural justice (Instrument)

In my top management team

1. Performance evaluation criteria appear to me as coherent with the corporate values (e.g. customer satisfaction, team spirit, collaboration)
2. There exists a well-known corporate procedure in regard to performance evaluation
3. The criteria used to grant promotions are clearly defined
4. Good performance fairly increases the chances of being promoted
5. The criteria used to grant salary raises are known from all employees
6. Management provides clear information in regard to any compensation discrepancies with the market
7. Management is transparent in terms of compensation management
8. Mechanisms adopted to determine salary levels are fair to all employees
9. In my work unit, the criteria used to grant salary raises are clearly defined

Table A1.**About the authors**

Wenjun Cai is an assistant professor at South China Agricultural University. Her research focuses on innovation management and entrepreneurship.

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RESEARCH ARTICLE

How Does Artificial Intelligence Awareness Impact Employee Attrition: The Roles of Work Anxiety and Self-Efficacy

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Keywords: AI knowledge | artificial intelligence | employee attrition | self-efficacy | workplace anxiety

ABSTRACT

Employee attrition is a significant consequence of AI awareness in the hospitality industry. However, the mechanisms linking AI awareness to employee attrition remain underexplored. This study addresses this gap by developing a model grounded in cognitive-affective processing system theory to elucidate how and when AI awareness accelerates hotel employee attrition. Using a field survey with a sample of 216 hotel employees in China, the results demonstrate that (1) AI awareness is positively associated with hotel employee attrition, (2) the positive effect of AI awareness on employee attrition is mediated by self-efficacy and workplace anxiety and (3) AI knowledge acts as a significant moderator such that the impact of AI awareness on increasing workplace anxiety and diminishing self-efficacy is amplified among hotel employees with greater AI knowledge. Our research provides a comprehensive explanation of how and when AI awareness influences employee attrition from a dual pathway of self-efficacy and workplace anxiety, thereby enriching the literature on AI and employee attrition in the hospitality management domain.

1 | Introduction

The hospitality industry has long struggled with high employee attrition (Bakir et al. 2025). In particular, the widespread adoption of artificial intelligence (AI), a key feature of Industry 4.0 (Ding 2021), has added complexity to this issue. Although AI, the human-like intelligence demonstrated by machines (Koo, Curtis and Ryan 2021; Lu, Cai and Gursoy 2019), enhances service quality and efficiency, it also poses a threat of job loss and wage reductions for employees (Dogru et al. 2025). Compared with human workers, AI offers a broader operational scope, lower energy consumption and greater efficiency (Teng et al. 2024). Considering AI's advantages in reducing

operational costs, Frey and Osborne (2017) forecasted that over 95% of hospitality jobs could be replaced by AI. Similarly, Gursoy, Li and Song (2023) suggested that generative AI could eliminate many positions in hotels, particularly in customer service and concierge roles. The perceived threat of being replaced by AI is known as AI awareness (Brougham and Haar 2018). AI awareness can cause stress, insecurity and anxiety among hotel workers, often leading to their resignation (Bakir et al. 2025). Given the high rate of employee attrition and the increasing adoption of AI in the hospitality industry, which threatens jobs while improving efficiency, examining the relationship between AI awareness and hotel employee attrition is worthwhile.

An increasing body of research has focused on the direct and negative effects of AI awareness on attrition (e.g., Brougham and Haar 2018; Khaliq et al. 2022; Li, Bonn and Ye 2019; Yu et al. 2022). However, studies examining the mechanisms linking AI awareness to employee attrition remain limited, with most exploring this relationship through the lenses of job insecurity and emotional exhaustion, where AI usage is considered a hindrance demand. For instance, Nguyen and Nguyen (2025) and Teng et al. (2024) demonstrated that AI awareness can increase job insecurity and emotional exhaustion, which in turn heighten employees' attrition, such as work withdrawal and turnover intention. Additionally, Lu et al. (2024) reported that in the online travel agency industry, employees' awareness of ChatGPT influences their turnover intentions through job insecurity.

Although this stream of research provides valuable insights into how AI awareness leads to employee attrition, our current understanding of this topic remains far incomplete or superficial, particularly with respect to key cognitive reactions to AI adoption at work. Mirbabaie et al. (2022) noted that the introduction of AI may challenge employees' self-beliefs, potentially triggering resistance behaviours. However, cognitive mechanisms for AI awareness and employee attrition have been largely overlooked. The literature on stressors has also suggested that work stressors can simultaneously trigger negative emotion and cognition, which ultimately translate into attrition (N. P. Podsakoff et al. 2007). Additionally, recent review studies have emphasized the need for further research to fully understand the intricate relationship between AI awareness and employee attrition (Bakir et al. 2025).

To address the shortage in theory and respond to recent calls for further research, our study aims to examine the mechanisms through which AI awareness gives rise to employee attrition by adopting the cognitive-affective processing system (CAPS) theory (Mischel and Shoda 1995), which offers an integrative framework for explaining how, why and when external situations shape employee attrition (Zimmerman et al. 2016). According to CAPS theory, individuals process situational stimuli, such as work stressors, to generate cognitive (e.g., belief) and emotional (e.g., mood state) units, which in turn shape their behaviour (Kell 2018; Mischel and Shoda 1995). Beliefs such as self-efficacy are critical cognitions influencing the likelihood of one's withdrawal decisions, and such behaviour is often under the control of negative moods such as anxiety (Zimmerman et al. 2016). Given that AI awareness is generally considered a work stressor (He, Teng and Song 2024), our study explores how AI awareness influences employee attrition through cognitive (i.e., self-efficacy) and affective (i.e., workplace anxiety) pathways, grounded in the framework of CAPS theory (Mischel and Shoda 1995).

Furthermore, the existing research on AI awareness and employee attrition has identified several boundary conditions, including leadership (e.g., transformational leadership, Yu et al. 2022), relational factors (e.g., perceived organizational support, Li, Bonn and Ye 2019), contextual factors (e.g., competitive psychological climates, Doan and Nguyen 2025) and individual factors (e.g., emotional intelligence, Nguyen and Nguyen 2025). However, the majority of this work has focused on the moderating roles of these general organizational and personal concepts while paying relatively little attention to factors that are

directly related to AI-specific contexts. Previous research has shown that an individual's level of stress perception, which activates cognitive and affective units, depends on personal resources (e.g., Bowling and Eschleman 2010; Kammeyer-Mueller, Judge and Scott 2009; Zellars et al. 2006). In AI research, AI knowledge, indicating workers' grasp of AI technology and its developmental phase (Chiu, Zhu and Corbett 2021), is a crucial personal resource and has been identified as a significant contingency affecting the negative outcomes of AI awareness (He, Teng and Song 2024). Given the crucial role of AI knowledge in shaping employees' responses to AI awareness and the relative neglect of AI-related moderators in prior research, our study seeks to explore whether the effects of AI awareness on self-efficacy and workplace anxiety are moderated by employees' AI knowledge.

Overall, the theoretical contributions of this study can be summarized in two aspects. First, by identifying the cognitive (i.e., self-efficacy) and affective (i.e., workplace anxiety) pathways that connect AI awareness to employee attrition, this study not only provides an integrative framework to explain how AI awareness leads to employee attrition but also responds to the call (Bakir et al. 2025) for further clarification of this relationship. Moreover, examination of self-efficacy and workplace anxiety as mediators enriches the literature regarding the limited exploration of mediating mechanisms linking AI awareness to employee attrition (e.g., Lu, Zhao and Chen 2024; Nguyen and Nguyen 2025), which has often emphasized emotional responses but neglected cognitive reactions. Second, by identifying AI knowledge as a moderator, our research provides a novel perspective on the boundary conditions of AI awareness and employee attrition, thereby enriching previous studies (e.g., Doan and Nguyen 2025; Nguyen and Nguyen 2025) that have focused exclusively on general concepts while overlooking AI-related moderators. The theoretical model of this study is presented in Figure 1.

2 | Theory and Hypotheses

2.1 | Literature Review

AI awareness is defined as employees' subjective perception of the extent to which their jobs are likely to be replaced by AI-driven machines in the digital era (Brougham and Haar 2018; He, Teng and Song 2024). In recent years, scholars have increasingly examined the psychological and behavioural consequences of AI awareness. For example, Brougham and Haar (2018) reported that employees who perceive AI as a job threat tend to experience higher levels of depression, cynicism and burnout. They also found that AI awareness is negatively associated with organizational commitment and career satisfaction. Similarly, Mirbabaie et al. (2022) revealed that the introduction of AI challenges employees' self-beliefs, whereas Huang and Guroy (2024) noted that AI awareness, as a hindrance stressor, induces job insecurity and suppresses proactive service behaviours. In addition, other studies have shown that AI awareness affects employees' mental well-being and overall work performance (Kong et al. 2021 2024; Liu et al. 2024).

Given that AI awareness can cause stress, insecurity and anxiety among hotel workers, it often leads to their resignation (Bakir

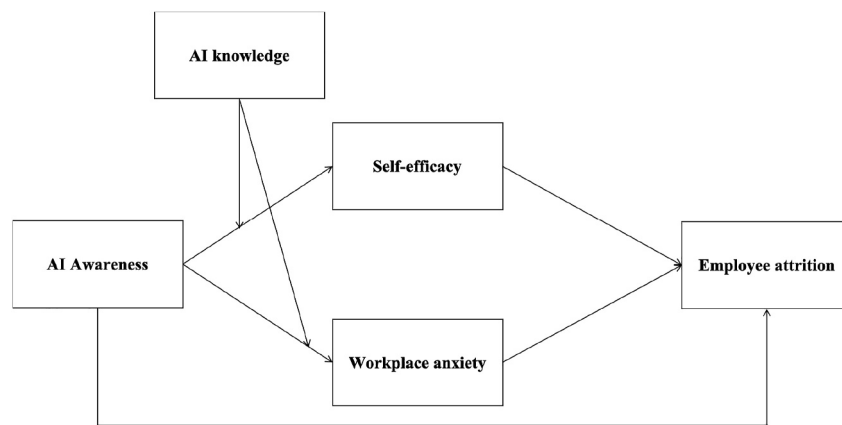


FIGURE 1 | Theoretical model.

et al. 2025). Recent studies have increasingly focused on the impact of AI awareness on employee attrition (e.g., Brougham and Haar 2018; Khaliq et al. 2022; Li, Bonn and Ye 2019; Yu et al. 2022). For instance, Li, Bonn and Ye (2019) found that awareness of AI and robotics significantly increases turnover intention among full-time employees in five-star hotels. Some scholars have explored the mediating mechanisms of this relationship, suggesting that AI awareness induces job insecurity and emotional exhaustion, which in turn lead to work withdrawal and increased turnover intention (Nguyen and Nguyen 2025; Teng et al. 2024). Similarly, Lu et al. (2024) showed that in the online travel agency sector, employees' awareness of ChatGPT increases turnover intention through perceived job insecurity. Additionally, prior studies have explored various boundary conditions influencing AI awareness and employee attrition from the perspectives of organizations, leadership and personal traits, such as transformational leadership (Yu et al. 2022), perceived organizational support (Li, Bonn and Ye 2019) and individual emotional intelligence (Nguyen and Nguyen 2025).

Although previous studies have discussed the relationship between AI awareness and employee attrition, they have predominantly focused on emotional exhaustion and job insecurity as mediating mechanisms (e.g., Lu, Zhao and Chen 2024; Teng et al. 2024). However, they have largely overlooked potential cognitive pathways, despite growing evidence that stressors such as AI introduction can fundamentally challenge employees' self-beliefs and activate cognitive responses (Mirbabaie et al. 2022; N. P. Podsakoff et al. 2007). Moreover, although existing research on boundary conditions has mainly addressed general organizational and individual factors (e.g., Li, Bonn and Ye 2019; Yu et al. 2022), it has neglected context-specific variables related to AI. To address these gaps, this study adopts the cognitive-affective personality system (CAPS) framework to investigate the cognitive and emotional mechanisms through which AI awareness influences employee attrition and considers how AI knowledge, as a contextual factor, shapes this process.

2.2 | The Cognitive-Affective Processing System (CAPS) Theory

CAPS theory, developed by Mischel and Shoda (1995), offers a highly versatile theoretical framework to predict employees'

behavioural outcomes, such as job performance and withdrawal behaviours (e.g., attrition) (Kell 2018; Minbashian and Lupino 2014). CAPS theory holds that focusing only on the people or the context is not enough for a comprehensive understanding of the people's behaviour; the key is to study the 'situated person'—the person in a particular context (Mischel and Shoda 2010). The 'situated person' first interprets situational features, then activates cognitive and affective processes and consequently makes behavioural responses (Zimmerman et al. 2016). That is, how the person codes the situation does not have a direct influence on decision-making but rather through cognitive and affective processes.

On the basis of CAPS theory, AI awareness, which reflects the features of situations (i.e., uncertainties at work) in the digital era (Kong et al. 2021; Liang et al. 2022), may drive the affective and cognitive units. According to CAPS theory, self-efficacy is the critical cognitive unit because of its enormous impact on the possibility of carrying out actions (Kell 2018). For example, compared with those with high self-efficacy, people who lack self-efficacy have less confidence in achieving desirable performance outcomes, which may lead them to consider quitting (Albrecht and Marty 2020; Caprara et al. 2011). With respect to affective units, experienced stress (e.g., anxiety and tension) is considered one of the core affective units for explaining one's intent to leave, as turnover is deemed by strained employees as an effective method by which to escape from stressful work situations (Cole et al. 2010; Maslach, Schaufeli and Leiter 2001; Zimmerman et al. 2016). In summary, we draw on CAPS theory to theorize that AI awareness influences employee attrition through cognitive (i.e., self-efficacy) and emotional (i.e., workplace anxiety) pathways.

2.3 | Direct Relationship Between AI Awareness and Employee Attrition

According to the attrition literature, employee attrition is a typical form of coping when an individual faces a stressful environment (N. P. Podsakoff et al. 2007). In several empirical studies, attrition has been documented to be one of the significant consequences of stressful work (e.g., Chen, Lin and Lien 2011; Jensen, Patel and Messersmith 2013; Raza, St-Onge and Ali 2021). In particular, owing to the risk perception that

people will be supplanted by AI and lose jobs for the time to come, employees are likely to appraise AI awareness as a hindrance demand, which is a threat and obstacle to personal growth and career development (Li, Bonn and Ye 2019; Liang et al. 2022). Investing their existing resources to meet hindrance demands is improbable, as employees believe that they cannot attain valued outcomes through resource investment (Azeem et al. 2023). For this reason, employees are unlikely to perform well, and they tend to think about leaving (Abbas and Raja 2019). Indeed, recent work conducted by Li, Bonn and Ye (2019) and Teng et al. (2024) documented that employees' awareness of artificial intelligence and robotics increases the rates of employee attrition. On the basis of theory analysis and empirical study, we propose a positive relationship between AI awareness and employee attrition.

Hypothesis 1. *AI awareness is positively related to employee attrition.*

2.4 | The Cognitive Pathway: Self-Efficacy as the Mediating Mechanism

Self-efficacy is conceptualized as self-confidence in one's capability to complete a certain task (Bandura 2000; Ozyilmaz, Erdogan and Karaeminogullari 2018). The increase or decrease in self-efficacy depends on environmental conditions (Bandura 2012), and this argument has been supported by several empirical evidence (e.g., Jaiswal and Dhar 2015; Tomas, Maslić Seršić and De Witte 2019; Wattoo, Zhao and Xi 2020). Given that work-related demand is considered one element of work environments (LePine et al. 2022), AI awareness, a typical hindrance demand (Li, Bonn and Ye 2019), is proposed to deplete employees of self-efficacy at work.

In the case of AI awareness, employees may generate feelings of helplessness and lack confidence, thereby restraining their self-efficacy (Dickerson and Kemeny 2004) because hindrance demands such as AI awareness cannot be met by expended effort (Azeem et al. 2023). Previous work has shown that employees' work motivation, such as self-efficacy, can be inhibited by hindrance job demands (J. A. LePine et al. 2005; Webster, Beehr and Christiansen 2010). In addition, there is a belief that machines with AI will gradually replace today's jobs that require physical labour or brainpower (He, Teng and Song 2024). In workplaces where advanced technologies, including AI, are adopted to replace human labour, employees may experience feelings of depreciation and unappreciation (Brougham and Haar 2018). As such, employees tend to be assailed by self-doubt, and consequently, their self-efficacy is undermined (Alisic and Wiese 2020; Liang et al. 2022).

Based on the above analysis, we propose a negative relationship between AI awareness and employees' self-efficacy.

Hypothesis 2a. *AI awareness is negatively related to employees' self-efficacy.*

Next, how does self-efficacy influence employee attrition? Self-efficacious employees tend to exhibit significant persistence

and invest more effort in the pursuit of challenging goals instead of fearing setbacks in the workplace (Bradley and Roberts 2004). There are significant chances for employees with belief in self-efficacy to achieve successful work outcomes; thus, such employees tend to be satisfied with their jobs (Judge and Bono 2001). Owing to the effort expended on the job, self-efficacious employees also show strong commitment to their employing organizations and their current job (Albrecht and Marty 2020; Lin 2020). Consequently, the likelihood of retention in the workplace is increased, and employees with self-efficacy are unwilling to give up their work (Tschopp, Grote and Gerber 2014). In contrast, employees who lack self-efficacy tend to regard work tasks as stressful rather than challenging (Bandura 2012; Ren and Chadee 2017) and thus possibly withdraw from their current work, as demission is deemed an effective way to conserve existing resources (Park and Min 2020). We therefore propose that belief in self-efficacy decreases the likelihood of employees disengaging from work. This is consistent with CAPS theory, which suggests that cognition, such as self-efficacy, is one of the determinants of one's withdrawal (Kell 2018; Zimmerman et al. 2016). Some recent empirical studies support this view (e.g., Albrecht and Marty 2020; Chami-Malaeb 2022; Gaan and Shin 2023).

Overall, we propose from CAPS theory (Kell 2018) that self-efficacy is the key cognitive path linking AI awareness and employee attrition. Specifically, AI awareness is supposed to increase employee attrition by inhibiting self-efficacy.

Hypothesis 2b. *Self-efficacy is negatively related to employee attrition.*

Hypothesis 2c. *AI awareness has an indirect effect on employee attrition via self-efficacy.*

2.5 | Emotional Pathway: Workplace Anxiety as a Mediating Mechanism

Workplace anxiety refers to the extent to which an employee feels nervous, uneasy and tense about work-related performance (McCarthy, Trougakos and Cheng 2016), which is a responsive reaction to workplace stressors (e.g., demands at work) and is part of a strain reaction (Cheng and McCarthy 2018). Workplace demands, such as hindrance demands, have been found to contribute to feelings of anxiety (Dawson, O'Brien and Beehr 2016; Mawritz, Folger and Latham 2014). As such, we propose that AI awareness, as a type of hindrance demand at work (Li, Bonn and Ye 2019), triggers employee workplace anxiety.

AI is a threat that cannot be ignored by people in the job market, and they are facing an increasing likelihood of job losses in the era of AI (Kaya et al. 2024). For example, 360,000 to 670,000 jobs are replaced by robotics annually (Acemoglu and Restrepo 2020), and 47% of workers are likely to lose their jobs within the next few years owing to AI and robotics in the United States (Frey and Osborne 2017). Thus, AI awareness will make employees clearly realize that they are at high risk of being substituted by AI, thereby leading to an anxious state (Ereback and Turgut 2021; Gabriel and

Pessl 2016). The perceived risk of job replacement by AI will also significantly intensify the competition between employees (Frey and Osborne 2017). Employees may strive for more work resources (e.g., recognition from employers) via dysfunctional competition, such as knowledge hiding, thereby leading to a toxic and unsafe working environment where employees feel anxious (Brougham and Haar 2018; Li, Bonn and Ye 2019). Moreover, previous studies have shown that AI awareness triggers employees' anxious emotions (e.g., Alisic and Wiese 2020; Liang et al. 2022).

Based on the above analysis, we propose a positive relationship between AI awareness and employees' workplace anxiety.

Hypothesis 3a. *AI awareness is positively related to employees' workplace anxiety.*

Next, how does workplace anxiety influence employee attrition? Anxious employees are beset by worries about task-related issues and develop self-critical attitudes toward their abilities (Kokubun, Ino and Ishimura 2022; McCarthy, Trougakos and Cheng 2016). That is, they may experience continuous resource losses and thus be in a state of depletion of resources (Lapointe, Vandenberghe and Panaccio 2011). The first choice for such employees is to avoid further resource losses by protecting their remaining resources and reducing further resource investment (Hobfoll 2002; Raza, St-Onge and Ali 2021). As such, workplace anxiety is proposed to motivate employees to quit, as voluntary turnover is regarded as a path for changing the status quo, including disengaging psychological distress at work and avoiding further resource losses (Debus and Unger 2017; Kokubun, Ino and Ishimura 2022; Rubenstein, Peltokorpi and Allen 2020).

Workplace anxiety may also lead employees to be emotionally exhausted because of the depletion of resources (McCarthy, Trougakos and Cheng 2016). Employees who suffer high-level emotional exhaustion are inclined to remove themselves from the current workplace, ultimately resulting in increased attrition. Empirical studies on emotional exhaustion have revealed its positive predictive role in employee attrition (Pu et al. 2024; Tourigny et al. 2013). Furthermore, recent work suggests that workers in the service industry are likely to show a high level of attrition as they are susceptible to workplace anxiety and emotional exhaustion (Raza, St-Onge and Ali 2021). Consistent with CAPS theory, which proposes that one's decision to withdraw partially depends on affects such as anxiety (Kell 2018; Zimmerman et al. 2016), we therefore propose that employees may respond to workplace anxiety by increasing attrition.

Overall, we propose from CAPS theory (Kell 2018) that workplace anxiety is the key affective path linking AI awareness and employee attrition. Specifically, AI awareness is supposed to arouse employees' feelings of anxiety in the workplace and ultimately increase their attrition.

Hypothesis 3b. *Workplace anxiety is positively related to employee attrition.*

Hypothesis 3c. *AI awareness has an indirect effect on employee attrition via workplace anxiety.*

2.6 | Employees' AI Knowledge as the Boundary Condition

Previous research has suggested that the influences of hindrance job demands depend on available resources (Bakker, Demerouti and Sanz-Vergel 2023; Tadić, Bakker and Oerlemans 2015; Wei, Zhu and Chen 2021b). Resources such as AI knowledge, which captures employees' perceptions of what they know about AI, have been suggested to influence employees' perceptions of AI-related risks, which may further change their affective and cognitive reactions to AI (Chiu, Zhu and Corbett 2021; Said et al. 2023). Therefore, we further propose that AI knowledge interacts with AI awareness to impact employees' cognition (i.e., self-efficacy) and affection (i.e., workplace anxiety).

In particular, employees with more AI knowledge are more likely to assess AI from a long-term perspective (Chiu, Zhu and Corbett 2021). That is, AI knowledge enables employees to have a more accurate judgement of AI development trends, especially in the workplace. For these knowledgeable employees, the replacement of human workers with AI seems to be an inevitable trend; consequently, AI is considered a serious threat to job security (He, Teng and Song 2024). This perception can amplify workplace anxiety, as their heightened awareness of AI's potential to displace jobs intensifies feelings of unease. In other words, the impact of AI awareness on workplace anxiety is more pronounced among employees with extensive AI knowledge.

Employees with high levels of AI knowledge also have a deeper understanding of the capability of AI technology (Chiu, Zhu and Corbett 2021). This in-depth understanding helps employees realize that AI is much more powerful than the human brain is. Thus, employees with more AI knowledge tend to interpret AI as an unbeatable opponent that cannot be overcome by sheer efforts (He, Teng and Song 2024). There is a greater likelihood of ascribing AI usage to hindrance demands among employees with high AI knowledge. Consequently, these knowledgeable employees become depressed and less confident in their working competence, which may further destroy their self-efficacy and amplify anxiety (Bakir et al. 2025). In contrast, in the case where AI knowledge is lacking, employees tend to identify fewer threats from AI, as they have a limited understanding of AI capability and trends in the workplace. Thus, such employees are supposed to place less weight on the hindrance aspect of AI awareness (He, Teng and Song 2024), and consequently, the effects of AI awareness on self-efficacy and workplace anxiety are amplified among employees with low AI knowledge.

Taken together, AI knowledge is supposed to work as an amplifier that intensifies the impact of AI awareness on employees' workplace anxiety and self-efficacy. Based on these arguments, we hypothesize the following:

Hypothesis 4a. *AI knowledge moderates the negative effect of AI awareness on self-efficacy such that this negative impact is stronger when employees have a high level of AI knowledge.*

Hypothesis 4b. *AI knowledge moderates the positive effect of AI awareness on workplace anxiety such that this positive effect is stronger when employees have a high level of AI knowledge.*

3 | Methods

3.1 | Participants and Procedures

Data were collected from employees who worked in hospitality. Given that one's perception of AI differs across regions and that data from a single region may lead to nonnegligible research bias (Liang et al. 2022), questionnaires were distributed via a Chinese online survey platform, namely, Credamo (<https://www.credamo.com/#/>), to collect data from diverse regions. Credamo is an effective platform that can help researchers gather valid data, especially in the service management domain (He, Teng and Song 2024). To avoid misunderstanding, a precise definition of AI and its applications in the hospitality management field was offered at the outset of the questionnaire. Specifically, AI is a form of human-like intelligence demonstrated by machines that aims to provide unique services for customers through deep learning algorithms (Koo, Curtis and Ryan 2021; Lu, Cai and Gursoy 2019). Examples of AI applications in the hotel context include receptionist robots, concierge robots, room service robots, delivery robots, outbound call robots, facial recognition systems, AI chatbots, etc., (Koo, Curtis and Ryan 2021; Teng et al. 2024). Experience working with AI was the criterion for sample selection. Following the approach used in prior studies (e.g., He, Teng and Song 2024; Teng et al. 2024) on AI awareness, we asked participants a screening question at the beginning of the survey: 'Have you ever worked with AI to provide customer service in your current job?' Only those who answered affirmatively were allowed to complete the questionnaire. They were asked to provide demographic information and complete measures of AI knowledge, AI awareness, self-efficacy, workplace anxiety and attrition. The respondents who completed this survey were guaranteed to receive RMB 5 as a reward. There were 300 people who were willing to participate in this research. Owing to missing data, the final sample consisted of 216 respondents, yielding a response rate of 72.0%. The participants, drawn from 27 provincial-level administrative regions across most parts of China, ensure the representativeness of the sample.

Detailed demographic information on 216 participants is displayed in Table 1.

3.2 | Measures

All key constructs were rated on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree'). Following Brislin's (1986) back-translation procedure, scales of AI knowledge, AI awareness, self-efficacy, workplace anxiety and employee attrition that were developed in English were translated into Chinese. To ensure accuracy in the translation and the rationality of questionnaire design, a preliminary test ($n = 60$) was conducted on Credamo.

AI awareness was assessed by adapting the 4-item scale from Brougham and Haar (2018). Participants were asked to report their perceptions of uncertainties caused by AI on future work prospects by responding to such items as 'I am personally worried about my future in my industry due to AI replacing

employees' and 'I think my job could be replaced by AI' ($\alpha = 0.88$).

Self-efficacy was evaluated by using the 3-item scale developed by Spreitzer (1995). Sample items included 'I am confident about my ability to do my job' and 'I have mastered the skills necessary for my job' ($\alpha = 0.78$).

Workplace anxiety was measured by the 8-item scale from McCarthy, Trougakos and Cheng (2016). Participants were asked to rate the extent of their agreement on such items as 'I worry that I will not be able to successfully manage the demands of my job' and 'I am overwhelmed by thoughts of doing poorly at work' ($\alpha = 0.92$).

AI knowledge was measured by adopting Chiu et al.'s (2021) 5-item scale. Participants were asked to respond to such items as 'I know pretty much about AI' and 'Among my circle of friends, I'm one of the 'experts' on AI' ($\alpha = 0.82$).

Employee attrition was evaluated by using the 4-item scale from Scott et al. (1999). Participants were asked to report the possibilities of leaving their jobs by evaluating items such as 'I would prefer another more ideal job than the one I now work in' and 'I seriously intend to look for another job within the next year' ($\alpha = 0.83$).

3.3 | Controls

Age, gender and education level as controls were added to our model, as these demographic factors may influence subordinates' intention to leave voluntarily (e.g., Scott et al. 1999; Waldman, Carter and Hom 2015).

4 | Results

4.1 | Preliminary Analyses

Table 2 presents descriptive statistics (i.e., means and standard deviations) of the study variables (i.e., AI knowledge, AI awareness, self-efficacy, workplace anxiety and employee attrition) and their intercorrelations. AI awareness's relations to self-efficacy ($r = -0.17$, $p < 0.05$), workplace anxiety ($r = 0.49$, $p < 0.001$) and employee attrition ($r = 0.24$, $p < 0.001$) were significant. Self-efficacy ($r = -0.36$, $p < 0.001$) and workplace anxiety ($r = 0.28$, $p < 0.001$) were significantly related to attrition, respectively. These results provided rudimentary support for our proposed assumption.

Confirmatory factor analyses, referred to as CFAs, were conducted by Mplus 7.0 to ensure that there was satisfactory discriminant validity in the measurement model consisting of 5 key constructs (i.e., AI knowledge, AI awareness, self-efficacy, workplace anxiety and employee attrition). Results in Table 3 indicated that the hypothesized model provided a satisfactory fit ($\chi^2(242) = 447.17$, $p < 0.001$; CFI = 0.92, TLI = 0.91, RMSEA = 0.06, SRMR = 0.05). It concludes that the discriminant validity of this study was acceptable.

TABLE 1 | Detailed demographic information on 216 participants.

Characteristic	Group	Frequency	%
Gender	Male	122	56.5
	Female	94	43.5
Age	< 21	4	1.9
	21–30	104	48.1
	31–40	86	39.8
	41–50	15	6.9
	> 50	7	3.2
Education	Junior high school or below	7	3.2
	Senior high school/technical secondary/technical school	27	12.5
	Junior college	45	20.8
	Bachelor	121	56.0
	Master and above	16	7.4
Position	Non-management	104	48.1
	Management	112	51.9
Tenure	Less than a year	14	6.5
	1–5 years	38	17.6
	2–5 years	77	35.6
	5–10 years	64	29.6
	Over 10 years	23	10.6
Ownership	State-owned enterprise	33	15.3
	Private enterprise	148	68.5
	Foreign enterprise/joint venture	25	11.6
	Others	10	4.6

TABLE 2 | Descriptive statistics, correlations and reliabilities among study variables.

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Gender	0.44	0.50	—							
2. Age	2.62	0.78	0.73	—						
3. Education	3.52	0.92	0.03	0.03	—					
4. AI knowledge	3.40	0.85	0.08	0.02	0.14*	(0.82)				
5. AI awareness	2.89	1.06	−0.02	−0.17*	−0.06	−0.29***	(0.88)			
6. Self-efficacy	3.80	0.72	−0.11	0.22***	0.08	0.36***	−0.17*	(0.78)		
7. Workplace anxiety	2.83	0.95	−0.07	−0.15*	0.02	−0.31***	0.49***	−0.21**	(0.92)	
8. Employee attrition	2.28	0.94	0.05	−0.21**	0.10	−0.30***	0.24***	−0.36***	0.28***	(0.83)

Note: *N* = 216. Age was measured on a 5-point scale (1 = '20 years or below' to 5 = '51 years or above'). Gender: 0 = female, 1 = male. Education was measured on a 5-point scale (1 = 'Junior middle school or below' to 5 = 'Postgraduate degree or above'). The diagonal elements (i.e., values in brackets) are the square roots of AVEs of the main variables in our model.

**p* < 0.05.

***p* < 0.01.

****p* < 0.001.

Harman's one-factor test (P. Podsakoff and Organ 1986) was conducted to address the potential issue of common method bias (CMB) arising from measuring data from the same source at the same stage. Results showed that the principal component factor analyses on all measure items yielded six factors, which collectively accounted for 71.28% of variance (eigenvalue > 1), and the first factor accounted for only 21.74% of variance. Because no factor explains more than 50% of the variance,

results of Harman's one-factor test indicate that common method variance was not an obstacle to our research (Ceylan 2013; López-Domínguez et al. 2013). In addition, following previous research (Kammerlander et al. 2015; Wei, Yin and Chen 2021a), we performed a confirmatory factor analysis and compared the fit indices between the one-factor model and the hypothesized measurement model. The fit of our measurement model ($\chi^2(242) = 447.17$, CFI = 0.92, TLI = 0.91, RMSEA = 0.06)

TABLE 3 | Comparisons of factor structures.

Model	Description	χ^2	df	CFI	TLI	RMSEA	SRMR
Model 1	Hypothesized model	447.17	242	0.92	0.91	0.06	0.05
Model 2	Four factors: Self-efficacy and workplace anxiety were combined into one factor	645.99	246	0.85	0.83	0.09	0.09
Model 3	Three factors: AI awareness, self-efficacy and workplace anxiety were combined into one factor	965.35	249	0.73	0.71	0.12	0.10
Model 4	Two factors: AI knowledge, AI awareness, self-efficacy and workplace anxiety were combined into one overall factor	1267.13	251	0.62	0.59	0.14	0.12
Model 5	One factor: AI knowledge, AI awareness, self-efficacy, workplace anxiety and employee attrition were combined into one overall factor	1526.99	252	0.53	0.48	0.15	0.14

Note: $n = 216$.

Abbreviations: CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; TLI = Tucker–Lewis index.

was significantly better than that of the one-factor model ($\chi^2(252) = 1526.99$, CFI = 0.53, TLI = 0.48, RMSEA = 0.15), suggesting the absence of CMB.

4.2 | Hypothesis Testing

The main effect of AI knowledge. Hypothesis 1 predicted that there was a positive relationship between AI awareness and employee attrition. As shown in Table 4, AI awareness was positively related to employee attrition ($\gamma = -0.21$, $p < 0.01$, Model 10). Thus, Hypothesis 1 received support.

The mediating effect of self-efficacy and workplace anxiety. Hypothesis 2c and Hypothesis 3c proposed self-efficacy and workplace anxiety as mediators in the relationship between AI awareness and employee attrition, respectively. We first followed procedures described by Baron and Kenny (1986) to conduct a mediation test. AI awareness was positively related to workplace anxiety ($\gamma = 0.48$, $p < 0.001$, Model 6), whereas it was negatively related to self-efficacy ($\gamma = -0.13$, $p < 0.05$, Model 2), supporting Hypotheses 2a and 3a. Employee attrition was negatively predicted by self-efficacy ($\gamma = -0.28$, $p < 0.001$, Model 12) and positively influenced by workplace anxiety ($\gamma = 0.21$, $p < 0.01$, Model 12), supporting Hypotheses 2b and 3b. As shown in Model 11, the relationship between AI awareness and employee attrition ($\gamma = 0.09$, ns) was not significant when self-efficacy ($\gamma = -0.28$, $p < 0.001$) and workplace anxiety ($\gamma = 0.16$, $p < 0.05$) were entered into the analysis. These results provided support for Hypothesis 2c and Hypothesis 3c. To further test the mediating effects, we conducted bootstrapping analysis (20,000 resamples) to re-examine the mediating effects of self-efficacy and workplace anxiety. As shown in Table 5, the indirect effects of AI awareness on employee attrition through self-efficacy and workplace anxiety were 0.033 (95% CI = [0.003, 0.017]) and 0.069 (95% CI = [0.009, 0.142]), excluding zero. These findings offered additional evidence for Hypothesis 2c and Hypothesis 3c.

The conditional effect of AI awareness. Hypothesis 4a predicted that AI knowledge would strengthen the negative relationship between AI awareness and self-efficacy. As shown in Table 4, the interaction between AI knowledge and AI awareness on self-efficacy was negatively significant ($\gamma = -0.21$, $p < 0.001$,

Model 4). Thus, Hypothesis 4a was supported. Hypothesis 4b predicted that AI knowledge would strengthen the positive relationship between AI awareness and workplace anxiety. Results in Model 8 showed that the interaction between AI knowledge and AI awareness on workplace anxiety was negatively significant ($\gamma = 0.16$, $p < 0.01$, Model 8). Thus, Hypothesis 4b was supported.

To further probe these moderating effects, we applied the Aiken, West and Reno (1991) procedure to depict the relationships between AI awareness and self-efficacy, as well as workplace anxiety, at high (+1 SD) and low (−1 SD) conditions of AI knowledge. As shown in Figure 2, the effect of AI awareness on self-efficacy was stronger when AI knowledge was high ($r = -0.22$, $p < 0.01$) rather than low ($r = 0.15$, ns). As illustrated in Figure 3, there was stronger effect of AI awareness on workplace anxiety when AI knowledge was high ($r = 0.56$, $p < 0.001$) than low ($r = 0.25$, $p < 0.01$). The above findings supported Hypotheses 4a and 4b.

5 | Discussion

The threat of wage cuts and job displacement that employees in the hospitality industry face due to AI development has become a widely recognized concern (Dogru et al. 2025). Drawing on CAPS theory (Mischel and Shoda 1995), our research examined how and when AI awareness may increase hotel employee attrition. First, the results reveal that AI awareness was positively related to employee attrition in the service industry. AI awareness is typically perceived by employees as a hindrance demand, as it triggers a sense of being potentially replaced by artificial intelligence, thereby posing a threat to personal growth and career development (Li, Bonn and Ye 2019; Liang et al. 2022). In response to such pressure, employees are often reluctant to invest their existing resources, as they believe such investment is unlikely to yield valuable outcomes (Azeem et al. 2023). As a result, employees may underperform and develop a tendency to leave the organization (Abbas and Raja 2019).

Second, the empirical results support that the positive relationship between AI awareness and employee attrition is

TABLE 4 | Results of hierarchical regression analyses.

Variables	DV = self-efficacy				DV = workplace anxiety				DV = employee attrition			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ
Gender	-0.13	-0.13	-0.15*	-0.15*	-0.06	-0.06	-0.04	-0.04	0.06	0.06	0.04	0.04
Age	0.23***	0.21**	0.22***	0.23***	-0.15*	-0.07	-0.08	-0.08	-0.21**	-0.17**	-0.10	-0.11
Education	0.08	0.07	0.02	0.04	0.02	0.05	0.07	0.06	-0.09	-0.08	-0.07	-0.08
AI awareness		-0.13*	-0.03	0.01		0.48***	0.42***	0.39***		-0.21**	0.09	
AI knowledge			0.36***	0.38***			-0.19**	-0.21***				
AI knowledge $\times$ AI awareness				-0.21***				0.16**				
Self-efficacy											-0.28***	-0.28***
Workplace anxiety											0.16*	0.21**
R^2	0.07	0.09	0.20	0.24	0.03	0.25	0.28	0.30	0.05	0.10	0.20	0.19
ΔR^2	0.07	0.02	0.11	0.04	0.03	0.22	0.03	0.03	0.05	0.04	0.10	0.14
F	5.41***	5.12***	10.65***	11.25***	1.92	17.21***	16.25***	15.20***	4.05**	5.53***	8.45***	9.80***
ΔF	5.41***	4.00*	29.98***	11.54***	1.92	61.44***	9.58**	7.47**	4.05**	9.50**	13.03***	17.48***

Note: $N = 216$.* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**TABLE 5** | Indirect effects of AI awareness (via self-efficacy and workplace anxiety) on employee attrition.

Path	AI awareness $\rightarrow$ self-efficacy $\rightarrow$ employee attrition	AI awareness $\rightarrow$ workplace anxiety $\rightarrow$ employee attrition
Bootstrap-indirect effect	0.033	0.069
Standard error	0.017	0.033
Lower limit 95% CI	0.003	0.009
Upper limit 95% CI	0.071	0.142
Adjusted R^2		0.172
$F(6,209)$		8.453***

Note: $N = 216$. Confidence intervals are bias-corrected based on 10,000 bootstrap samples.*** $p < 0.001$.

mediated by affect (i.e., workplace anxiety) and cognition (i.e., self-efficacy). CAPS theory (Mischel and Shoda 1995) provides an integrative framework to explain how AI awareness influences employee attrition by activating cognitive and affective units. As a form of hindrance demand, AI awareness can undermine employees' self-efficacy, leading to feelings of helplessness and a lack of confidence, which in turn reduces their persistence and engagement at work, thereby increasing their intention to leave (Bandura 2012; Azeem et al. 2023; Liang et al. 2022). Moreover, AI awareness triggers anxiety about job replacement, especially in the context of intensified competition and deteriorating work environments. This anxiety contributes to resource depletion and emotional exhaustion, ultimately prompting employees to quit as a way to escape psychological distress and preserve their remaining resources (McCarthy, Trougakos and Cheng 2016; Hobfoll 2002; Pu et al. 2024).

Therefore, the findings of this study support that AI awareness indirectly drives employee attrition by impairing cognitive resources (i.e., self-efficacy) and eliciting negative emotional responses (i.e., workplace anxiety).

Furthermore, we find that the positive effect of AI awareness on workplace anxiety and its negative effect on self-efficacy are amplified among employees with high-level AI knowledge. Prior research suggests that the effects of hindrance job demands, such as AI awareness, are contingent upon employees' available resources, particularly their knowledge of AI (Bakker, Demerouti and Sanz-Vergel 2023; Chiu, Zhu and Corbett 2021). Employees with high AI knowledge are more likely to perceive AI as an inevitable and powerful substitute for human labour, which intensifies their workplace anxiety and undermines their self-efficacy (He, Teng and Song 2024; Bakir et al. 2025). Based

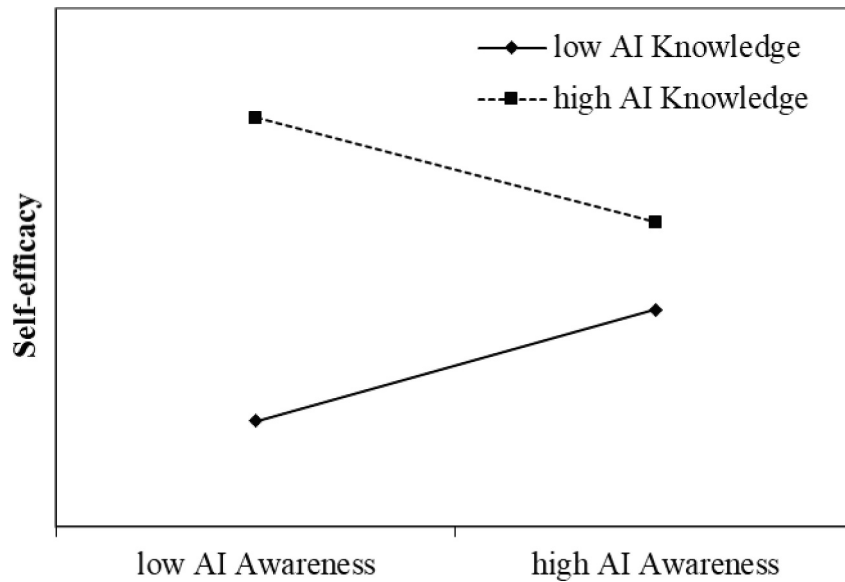


FIGURE 2 | The moderating effect of AI knowledge in the relationship between AI awareness and self-efficacy.

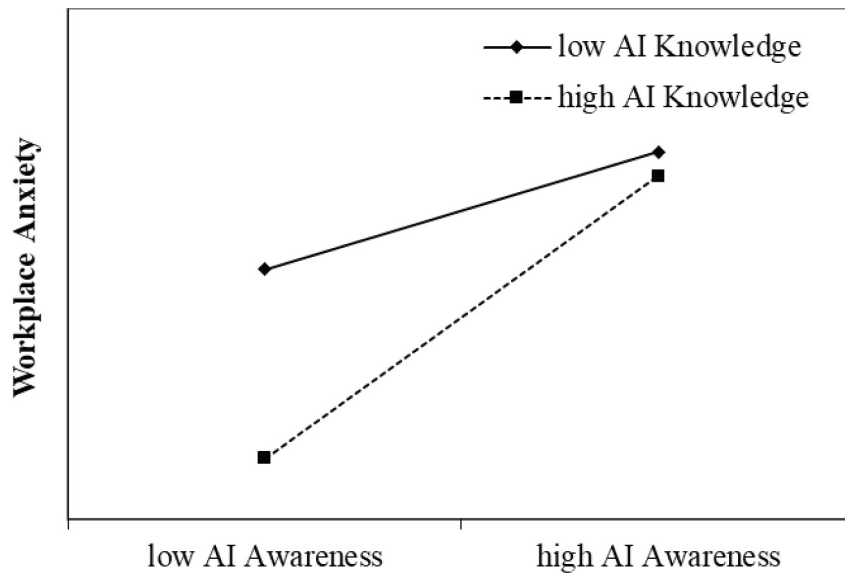


FIGURE 3 | The moderating effect of AI knowledge in the relationship between AI awareness and workplace anxiety.

on these findings, this study offers several important theoretical and practical implications as well as directions for future research.

5.1 | Theoretical Implications

Our study makes several theoretical contributions to the literature. First, our study reveals a positive correlation between AI awareness and employee attrition, which aligns with prior research across both the hospitality sector (e.g., Li, Bonn and Ye 2019; Teng et al. 2024) and other industries (e.g., Brougham and Haar 2018). This finding, however, contrasts with the work of Chang et al. (2021), which suggested that robots can reduce nurses' turnover intentions by enhancing job satisfaction and perceived health improvements. Furthermore, the broader literature on the implications of AI awareness for employees remains

inconclusive, with some studies showing that higher AI awareness can invoke negative responses due to fears of job replacement (e.g., He et al. 2025; Yu et al. 2022), whereas others highlight benefits such as improved job performance and innovation (Ahn, Park and Ye 2025; Liang et al. 2022). By confirming that AI awareness plays a positive role in employee attrition, our research contributes to the growing body of evidence indicating that heightened AI awareness can have detrimental effects on employees (e.g., He et al. 2025). This finding also highlights the need for further investigation into the impact of AI awareness on employees, as highlighted by Bakir et al. (2025).

Second, the results show that AI awareness deactivates self-efficacy and activates work anxiety, which in turn increases employee attrition. The examination of self-efficacy and work anxiety as dual mediators provides a nuanced explanation of how AI awareness contributes to employee attrition. Although

the direct effect of AI awareness on employee attrition has been extensively studied (e.g., Brougham and Haar 2018; Khaliq et al. 2022; Li, Bonn and Ye 2019; Yu et al. 2022), research into the pathways through which AI awareness influences employee attrition is still in its nascent stages, with the majority of existing studies focusing primarily on job insecurity and emotional exhaustion as mediating factors (e.g., Nguyen and Nguyen 2025) while overlooking the cognitive mechanisms. One notable exception is the study by Teng et al. (2024), which demonstrated that AI awareness can trigger employees' withdrawal behaviour through a sequential mediation process involving work rumination and emotional exhaustion. Our study advances this line of research by constructing a dual pathway—encompassing both affective and cognitive dimensions—that elucidates the connection between AI awareness and employee attrition, grounded in CAPS theory (Mischel and Shoda 1995).

Additionally, prior studies on AI awareness have largely relied on the conservation of resources theory and the job demand-resource theory to explore its effects on employees (for a comprehensive review, see Bakir et al. 2025). Our study employs CAPS theory to offer a novel perspective on how AI awareness affects employees. This approach not only enriches the theoretical understanding of AI's organizational impact but also extends the application of CAPS theory to the interdisciplinary domain of AI and organizational management.

Third, by integrating employees' AI knowledge as a moderator in our theoretical model, our research identifies the conditions under which the effects of AI awareness are intensified. The results indicate that the negative impact of AI awareness on employees' self-efficacy and its positive impact on work anxiety are more pronounced among employees with higher levels of AI knowledge. These findings indicate that AI knowledge, which serves as a personal resource (Chiu, Zhu and Corbett 2021), can magnify the impact of AI awareness on employees. This aligns with He, Teng and Song (2024), who revealed that AI awareness, as a hindrance, has a more pronounced effect on increasing insecurity among employees with higher levels of AI knowledge. Our research also challenges the common assumption that personal resources, such as AI knowledge, can buffer the undesirable consequences of job demands (Bakker and Demerouti 2017). Instead, our findings indicate that AI knowledge may actually amplify the negative effects of work stressors, specifically in the context of AI awareness. This highlights the complex interplay between personal resources and job situations.

5.2 | Practical Implications

This study has several practical implications. First, the findings of this study suggest that AI awareness leads to employee attrition. Managers should recognize this potential risk and proactively communicate that AI is intended to augment, not replace, human work. Strategies may include transparent communication about the organization's AI roadmap, highlighting opportunities for employees to engage with and benefit from AI applications and providing reassurances around job security. For example, managers can organize regular meetings

and Q&A sessions to address concerns and align AI usage with long-term employee development goals. Moreover, organizations can reduce the insecurity of replacement by AI by improving employees' adaptability. For example, organizations should offer more training programs that focus on both technical skills and fostering a positive mindset toward AI. By providing systematic training, organizations can alleviate employees' perceived threat from AI and help them better adapt to the evolving trends in AI development.

Second, this study confirmed that AI awareness reduces employees' self-efficacy and increases workplace anxiety. Organizations must incorporate emotional and cognitive support into their HR strategies. This may involve offering access to mental health resources, peer support groups and stress management workshops. In addition, leadership plays a critical role in guiding teams through AI-induced change. Managers should act as transformational leaders by articulating a shared vision for human-AI collaboration, modelling openness to AI adoption and recognizing employee efforts in adapting to technological shifts (Agaoglu et al. 2025; Yu et al. 2022). Leaders who are empathetic and supportive can significantly reduce employee anxiety and foster resilience.

Finally, this study reveals that the greater the degree of AI knowledge that employees possess, the more pronounced the reduction in self-efficacy and the increase in workplace anxiety due to AI awareness. This suggests that without proper guidance, AI knowledge may heighten employees' perceived threats. To address this, organizations should implement structured AI learning initiatives that not only improve their technical understanding but also emphasize the supportive role of AI in augmenting rather than replacing human work. These programs should be designed to help employees apply their AI knowledge to enhance job-relevant skills, build confidence and pursue long-term career development in an AI-integrated work environment.

5.3 | Limitations and Future Research

This study has several limitations that provide directions for future research. First, this study employed cross-sectional data, following the approach of prior research (e.g., He, Teng and Song 2024; Li, Bonn and Ye 2019; Liang et al. 2022), which limits the ability to establish robust causal relationships between variables. Future studies could address this limitation by using longitudinal surveys or experimental designs. Additionally, although Harman's one-factor test results indicated that CMB was not a significant concern in our dataset, future research may benefit from employing a multisource, multiwave design to further mitigate potential biases (P. M. Podsakoff et al. 2003). Second, the sample of this study was limited to employees in the Chinese hospitality industry. Further research could expand this model to the context of other countries and conduct cross-cultural comparisons. Finally, there are limitations in the selection of the moderating variables in this study. We only considered how AI knowledge, as a critical personal resource in the digital age, affects the relationship between AI awareness and employee attrition. Future studies could explore

additional moderating variables, such as organizational digital human resource management (Strohmeier 2020).

5.4 | Conclusion

This research aimed to investigate how and when AI awareness influences attrition of employees in the hospitality industry. We employed CAPS theory to elucidate the dual cognitive-affective pathways through which AI awareness increases employee attrition by examining the mediating roles of self-efficacy and workplace anxiety. The findings also suggested that AI knowledge strengthens the positive effect of AI awareness on workplace anxiety and its negative effect on self-efficacy.

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Ethics Statement

This article does not contain any studies with animals performed by any of the authors. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Consent

All participants included in this study provided consent to participate.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the results in this paper are available from the corresponding author upon personal request. The data are not currently publicly available due to privacy or ethical restrictions.

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How IOS integration enables business model innovation: an empirical study from organisational information processing perspective

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ABSTRACT

While inter-organisational systems (IOS) can significantly impact firm performance within supply chains, the influence of IOS integration on business model innovation (BMI) remains unclear. This paper aims to investigate how industry/political environmental uncertainty (IEU/PEU) moderates the relationship between IOS integration and two types of BMI, namely, novelty-centred BMI (NBMI) and efficiency-centred BMI (EBMI) using an organisational information processing perspective. We collected 184 matched-pair questionnaires from operations and IT executives of Chinese firms located in the Yangtze River Delta region. The results confirm a positive effect of IOS integration on both NBMI and EBMI. Furthermore, IEU positively moderates the relationship between IOS integration and NBMI/EBMI. PEU negatively moderates the effect of IOS integration on EBMI but insignificantly moderates the relationship between IOS integration and NBMI. Finally, this study provides theoretical and practical implications.

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IOS integration; business model innovation; political environmental uncertainty; industry environmental uncertainty

1. Introduction

In recent years, scholars and practitioners have increasingly focused on business model innovation (BMI) in the digital economy. This heightened attention stems from the growing opportunities for business model configuration generated by technological advancements, new customer preferences, and deregulation (Ramon and Zhu 2013; Vanpoucke, Vereecke, and Muylle 2017). BMI is a systematic and fundamental activity that enables firms to find new logics and methods to create value for their stakeholders, including suppliers, customers, and partners (Cheng et al. 2022; Lamperti, Cavallo, and Sassanelli 2023). Moreover, BMI is a driving force behind shifting competition dynamics within firms, impacting their long-term sustainability (Amit and Zott 2001). Previous literature has divided BMI into novelty-centered business model innovation (NBMI) and efficiency-centered business model innovation (EBMI), depending on the different emphases of BMI (Wei, Song, and Wang 2017). NBMI emphasises the adoption of new transaction approaches to foster innovation, while EBMI focuses on improving transaction efficiency through existing content, structure, and governance (Chen, Liu, and Chen 2022). Considering the different essential core between NBMI and EBMI, their formation mechanism may not be exactly the same. Hence, it is worthwhile to explore the specific mechanisms that shape NBMI/EBMI.

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In the era of digital transformation, the quest to harness IT for shaping BMI becomes a thrilling adventure. The rapid rise of digital infrastructure, the internet, smart products, and advanced technology has ushered in a golden age of inter-organisational information systems (IOS), paving the way for sharing vital insights and unlocking a world of competitive advantages (Lamperti, Cavallo, and Sassanelli 2023). IOS integration refers to the tightened linkages among firms and partners to integrate information through IOS, encompassing strategies such as delay and reconfigure, procurement, inventory management, and future planning. These approaches focus on IT linkage in the supply chain relationship to enhance coordination activities (Wang and Wei 2007). Indeed, firms use IOS integration to enhance relationships with supply chain partners, obtain timely business information, streamline operations, reduce complexity, and improve flexibility to address challenges (Wang, Tai, and Grover 2013). Moreover, previous literature indicated that the rapid development of IT can lead to informational uncertainty and asymmetry in innovative activities, and posited that information integration capacity among supply chain partners is a key factor affecting BMI (Feng, Yang, and Sheng 2024; Vanpoucke, Vereecke, and Muylle 2017). Although scholars have extensively proclaimed the important role of IT capability in business models, our understanding of the specific mechanisms between IOS integration and different BMIs remained limited.

Previous literature has revealed that innovation activities and processes can be affected by external environment uncertainty (Ramon and Zhu 2013), which calls for scholars to further analyse these effects from the perspectives of macro-level and micro-level environments (Yang, Geng, and Feng 2020). At the macro-level environment, firms in different regions are embedded within distinct policy environment, which plays a crucial role in business operations and can influence firm decision-making (Yang, Geng, and Feng 2020). As such, the firm located in different regions has their own political environmental uncertainty (PEU), characterised by frequent changes in relevant rules and regulations (Wang and Libaers 2016). The micro-level environment focuses on the interactions between firms and industry participants, which affects firms' operations (Gao et al. 2017). Thus, from micro-level perspective, we consider the moderating role of industry environmental uncertainty (IEU), which reflects the degree of market and technological turbulence (Pavlou and El Sawy 2006). Therefore, by integrating the macro-level and micro-level environmental perspectives, we further explore how PEU and IEU affect the relationship between IOS integration and NBMI/EBMI.

Given the preceding arguments, this study addresses two main contributions. First, our study contributes to expanding the application scenarios of OITP in the process of inter-organisation cooperation as well as enriches the existing literature on BMI from the boundary-spanning OIPT. The positive impact of IOS integration enables us to recognise the effective way to adopt inter-organisational systems for better BMI. Second, we further advance the OIPT by investigating the moderating role of external environmental uncertainty for the IOS integration-BMI information processing path. We explore the contingency conditions for understanding the IOS integration-BMI relationship by revealing the different moderating roles of PEU and IEU.

2. Theoretical background

2.1. Organisational information processing theory

Organisational information processing theory (OIPT) describes the information processing requirement of an organisation by analysing environmental and technical uncertainty, and it determines information processing capabilities by designing the organisational structure and processes (Galbraith 1974). OIPT explains the improvement of organisational performance by seeking a match between abilities and demands (Galbraith 1974). Furthermore, when applied to inter-organisational firms, OIPT can explain the mechanism of coordinating with partners to reduce supply chain uncertainty, which requires different information processing support (Daft and Lengel 1986). For example, different understandings of information input and output, and the lack of common cognitive ability in the process, can lead to misunderstandings and discrepancies in information processing (Saeed,

Malhotra, and Grover 2005). Therefore, as the main theoretical basis of this study, OIPT elucidates the impact of IOS integration on BMI from the perspective of inter-organisational information processing.

2.2. Business model innovation

As a new form of innovation, BMI has gradually surpassed technological innovation and has become a popular research object in Chinese business circles in recent years (Gerdoçi, Bortoluzzi, and Dibra 2018; Wei, Song, and Wang 2017). BMI primarily focuses on providing value, sustaining investment, managing the organisation, and exploiting how to develop knowledge and resources to pursue competitive advantages (Gerdoçi, Bortoluzzi, and Dibra 2018). Most of the existing research on BMI focused on benefits, such as superior firm performance and agility (Jin et al. 2022; Zott and Amit 2007). Some scholars also attempt to explore the antecedents of BMI from different perspectives, such as supply chain integration, technological innovation and so on (Feng, Yang, and Sheng 2024; Sousa-Zomer and Cauchick-Miguel 2019). Moreover, scholars have widely categorised BMI into NBMI and EBMI based on their distinct innovative approaches. EBMI aims at ‘efficiency’ by “refining and extending existing knowledge and capabilities to improve and optimise existing structures and governance” (Hu and Chen 2016, 586), while NBMI targets ‘novelty’ to achieve the exploratory goals of the organisation “by emphasising the use of new methods, pursuing new knowledge and ability for new development” (Hu and Chen 2016, 586). It is worthwhile to tease out the different enhancement mechanisms of NBMI and EBMI due to their different characteristics (Wei, Song, and Wang 2017). However, there is still limited understanding of the function of IOS in combination with OIPT.

2.3. IOS integration

Consistent with prior literature (da Silveira and Cagliano 2006), IOS integration is regarded as leveraging the information system to build tighter linkages among supply chain partners to gain competitive advantage, which forms the basis of the business operation mode of supply chain management. In the past few years, to achieve superior supply chain performance, firms have been trying to seek integration with partners to deal with supply chain uncertainty (Wang, Chou, and Lee 2014). To effectively combine inter-organisational systems and processes, firms need to integrate information and jointly solve problems caused by supply chain uncertainty through IOS to gain more benefits (Wu 2013). IOS integration is considered the ability to achieve consistent and real-time information transmission among supply chain partners, serving as a reliable capability platform (Overby, Bharadwaj, and Sambamurthy 2006). Furthermore, this platform enables firms to meet demands and seize opportunities flexibly and efficiently (Gallagher and Worrell 2008). IOS integration can help firms build competence to capitalise emerging opportunities (Wu 2013). Therefore, in this study, IOS integration reflects the pursuit of maximising common resources and interests through the integration of shared information and knowledge with partners.

3. Hypothesis development

From the lens of OIPT, we argue that IOS integration positively affects NBMI and EBMI differently and that the relationships can be moderated by macro- and micro-level environments separately. Figure 1 shows the research model.

3.1. The effect of IOS integration on NBMI and EBMI

IOS integration facilitates communications and interactions both inside and outside organisational boundaries, helping firms smoothly make sense of information from multiple sources (Gallagher

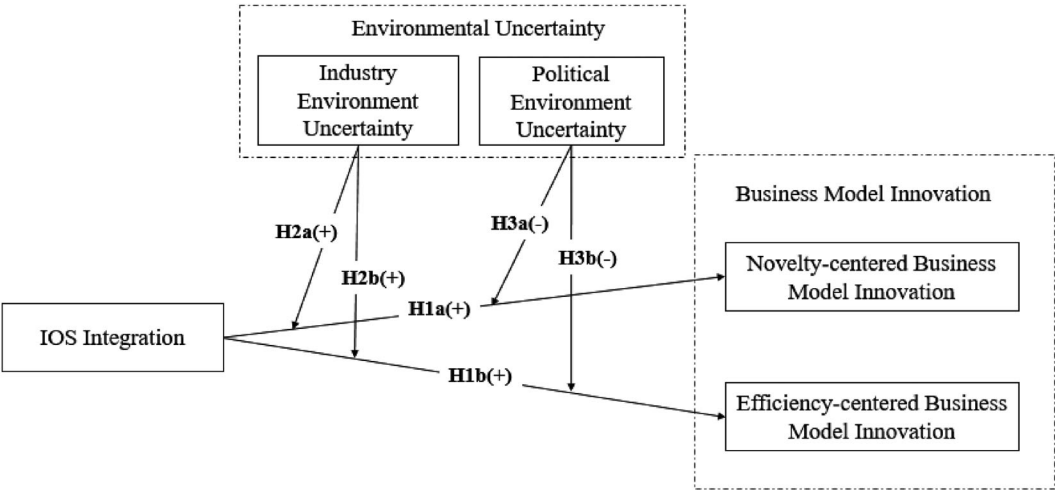


Figure 1. Research model.

and Worrell 2008). Integrating with OIPT, IOS integration can improve a firm’s information processing capability by offering a common platform where cooperative partners can share information to deal with complex environments and make effective decisions (Overby, Bharadwaj, and Sambamurthy 2006).

Specifically, for NBMI, such models often involve diverse and complex information requirements (Li and Chen 2023). Based on OIPT, IOS integration enhances a firm’s ability to handle complex and diverse information, enabling it to acquire, process, and analyse large amounts of data from various channels, thereby providing a foundation for innovation (Wang, Chou, and Lee 2014). IOS integration support real-time data processing, enabling them to respond flexibly to market changes, thereby developing NBMI. Furthermore, IOS integration breaks down information silos, enables all parties to share knowledge and resources, and provide rich informational support for NBMI (Feng, Yang, and Sheng 2024).

For EBMI, IOS integration can improve operational efficiency and reduce costs by automating and optimising inter-organisational processes and reducing redundant operations (Wang, Chou, and Lee 2014). Moreover, IOS integration improves the sharing and flow of knowledge across organisations, enabling firms to make full use of internal and external existing knowledge resources to promote business process optimisation and innovation. Through the collection and analysis of operational information, firms can reduce unnecessary communication and coordination costs, and achieve superior EBMI. Thus, according to OIPT, we hypothesise that:

Hypothesis 1a. IOS integration is positively associated with NBMI.

Hypothesis 1b. IOS integration is positively associated with EBMI.

3.2. The moderating effect of IEU

IEU is one of the most important micro-level environmental factors for firm operations. IEU reflects the change of speed, instability, and unpredictability in a firm’s external industry environment, such as changes in customers’ preferences, production, and technological revolution (Xue, Ray, and Sambamurthy 2012). In a highly IEU, market information changes frequently and unpredictably, and firms are in a state of information abundance. According to OIPT, compared with the situation of low IEU, firms can use IOS to integrate and analyse more complete information, thereby helping firms make more effective BMI decisions (Li et al. 2019).

Specifically, under high IEU, sudden business opportunities can be hard to spot, due to the rapid changes of market information. Meanwhile, NBMI requires firms to seize opportunities quickly. In this condition, diverse and timely information provided by IOS integration can help firms better seize opportunities to make more effective decisions, such as developing NBMI (Jin et al. 2022). When developing EBMI in a highly IEU, firms are under greater pressure to leverage diverse information and adjust process to reduce costs and improve efficiency (Bstieler 2005). At this time, with the help of IOS integration, firms can better analyse rich information, reduce operating and communication costs to a greater extent, and thus develop EBMI more efficiently (Jin et al. 2022). In summary, based on OIPT, we put forward that IEU strengthen the relationship between IOS integration and NBMI/EBMI. Therefore, we hypothesise that:

Hypothesis 2a. IEU positively moderates the relationship between IOS integration and NBMI.

Hypothesis 2b. IEU positively moderates the relationship between IOS integration and EBMI.

3.3. The moderating effect of PEU

The uncertainty caused by political regulation, known as PEU, is considered an important macro-level institutional environmental factor influencing firms' decisions (Hoffmann, Trautmann, and Hamprecht 2009). Governments provide regulations to maintain order in market operations and have the authority to allocate critical resources in the business process (Arnoldi and Villadsen 2015). Hence, the decision-making efficiency of the firm can be significantly affected by PEU (Hoffmann, Trautmann, and Hamprecht 2009). Under high PEU, higher risks and policy uncertainties hinders the firms' efficiency in processing information with IOS integration to develop NBMI/EBMI (Engau and Hoffmann 2011). Based on OIPT, firms may not be able to make effective decisions with the same information processing capabilities in high PEU, thus inhibiting the impact of IOS integration on NBMI/ EBMI.

In addition, inter-organisational partners may become more cautious due to political risks, reducing their willingness to share information and cooperate in innovation (Chen et al. 2017), thus affecting the effectiveness of IOS integration on NBMI/EBMI. Thus, even though firm can leverage IOS integration to establish efficient and timely information processing mechanisms, compared with low PEU, it will take more costs and may not get desired results (Hoffmann, Trautmann, and Hamprecht 2009). Therefore, based on OIPT, PEU reduces the information processing efficiency of IOS integration, thereby attenuating the impact of IOS integration on NBMI/EBMI. Thus, we hypothesise that:

Hypothesis 3a. PEU negatively moderates the relationship between IOS integration and NBMI.

Hypothesis 3b. PEU negatively moderates the relationship between IOS integration and EBMI.

4. Methodology

4.1. Sampling and data collection

With the recent rapid development of digital information technology and management operational systems in China, IOS has been increasingly used for coordination among supply chain firms (Saeed, Malhotra, and Grover 2005). The rise of China's IT has provided a strong impetus for the development of the global economy (Wang, Chou, and Lee 2014), making it a suitable research context. We conducted a survey of firms in different regions of China.

First, we obtained a list of 550 firms and the contact information of their managers with the help of a collaborating market research firm. We sent questionnaires to their senior managers, middle managers, and department/project executives. To avoid potential common method bias from single-source respondents, we collected match-paired questionnaires from respondents in the IT

department and the operational department of each firm. Specifically, we asked the operational managers to answer questionnaires about operationally relevant constructs (IEU/PEU) and asked the managers in IT departments to report IT-related constructs (IOS integration and NBMI/EBMI). Eventually, we acquired 194 match-paired responses. In addition, 10 invalid questionnaires were discarded because of incomplete or obvious response pattern, resulting in 184 completed responses and valid matched-pair data analysis for the research (response rate 33.45%). Table 1 shows the demographic information for the sample.

4.2. Measurement

The measurement in the study was derived from existing literature. The scale of each variable is shown in the Appendix. A 7-point Likert scale method was used to measure all constructs in the study, with the range of scores from 1 ('strongly disagree') to 7 ('strongly agree').

IOS integration. We measured IOS integration with five items from Wang, Chou, and Lee (2014) to describe the supply chain partner collaboration through digital applications.

NBMI and EBMI. NBMI was measured with six items from Gerdoçi, Bortoluzzi, and Dibra (2018), describing the pursuit of new combinations of products, services, information and the exploration of innovation by designing a new transaction/business model. EBMI was measured using eight items from Gerdoçi, Bortoluzzi, and Dibra (2018), which reflect the business model innovation aimed at low-cost business, simple and efficient transactions, demand aggregation, and error reduction.

IEU and PEU. According to existing literature, we adopted the four items of IEU from Pavlou and El Sawy (2006), and measured PEU with three items following Wang and Libaers (2016). IEU and PEU represent the degree of change in the external industry and policy environment perceived by firms' executives. In order to better understand IEU and PEU, we performed the one-way ANOVA

Table 1. Sample demographic ($N = 184$).

	<i>N</i>	Percentage (%)
Industry		
Manufacturing industries	74	40.22%
IT industry	43	23.37%
Financial industries	9	4.89%
Other service industries	58	31.52%
Ownership		
State-owned	101	54.89%
Non-state-owned	83	45.11%
Number of employees		
< = 100	47	25.54%
101–299	32	17.39%
300–499	15	8.15%
500–999	18	9.78%
1000–1999	9	4.89%
> = 2000	63	34.25%
Firm age		
1–5	25	13.59%
6–10	36	19.57%
11–25	62	33.70%
26–50	29	15.76%
> = 50	32	17.38%
Region		
Anhui Province	80	43.48%
Jiangsu Province	30	16.30%
Zhejiang Province	36	19.57%
Shanghai	20	10.87%
Guangdong Province	8	4.35%
Others	10	5.43%

for IEU by industry and PEU by region. The results showed that firms' IEU is significantly different in different industries ($F = 7.84, p < 0.001$), and PEU varies significantly by region ($F = 3.73, p < 0.01$).

Control variables. In this study, we considered several control variables including firm size, firm age, industry, and ownership. We controlled firm size using the total number of employees (Dong, Fang, and Straub 2017). We used three dummy variables to control for the industry: manufacturing industry, IT industry, and service industry, with the financial industry as the baseline group (Dong, Fang, and Straub 2017). Firm age was measured by the years the firm has been established (Dong, Fang, and Straub 2017). Ownership equals 1 if the firm is state owned and 0 otherwise (Zhou, Gao, and Zhao 2017).

4.3. Reliability and validity

We tested the construct reliability and validity of the measurement. As shown in Table 2, the lowest value of factor loading is 0.750, which exhibits the reliability of items. Table 2 also shows the value of Cronbach's alpha, composite reliability, and average variance extracted (AVE). These indicators of each construct exceed the thresholds, which provide support that the reliability and discriminant validity are adequate in this data. Then, we calculated the square root of the average variance extraction (AVE) and compared its correlation with the construct to test discriminant validity. The results are shown in Table 3. Table 3 also shows the mean value and standard deviation of each construct.

Furthermore, we conducted a confirmatory factor analysis (CFA) using the software AMOS 21.0. To reduce the number of parameters in our measurement model, we adopted the method of item parcelling recommended by Bagozzi and Edwards (1998). We created three parcels of items each for NBMI, EMBI, and IOSI. This method is widely used in management research and aims to balance the ratio of indicators to sample size (e.g. Aryee et al. 2015; Lam et al. 2018). The results of CFA are shown in Table 4, suggesting that the hypothesised measurement model has better fit indices ($\chi^2 = 210.106$, $df = 94$, $CFI = 0.958$, $TLI = 0.946$; $RMSEA = 0.082$, $SRMR = 0.043$) than any other alternative model. In summary, these results offered effective empirical support for the reliability and validity for our measurement model.

4.4. Common method bias

To avoid the potential influence of common method bias from single-source respondents, we collected data from multiple sources. Also, we applied two tests to check the concerns about common method bias. First, we used Harman's one factor test (Podsakoff, Mackenzie, and Podsakoff 2003). We extracted 7 factors with eigenvalues greater than 1, and the results showed that the covariance explained by one factor was 25.096%, indicating that no factor accounted for the vast majority of the covariance of all variables.

In addition, following Flynn, Huo, and Zhao (2010), we incorporated a common method factor to comprise all constructs' indicators. We compared the fit of our measurement model with only constructs against two different models: one with only the common method factor, and another that included both the common method factor and the original constructs. The fit indices for the one-

Table 2. Loading, Cronbach's Alpha, Composite Reliability, and AVE.

Indicators	Loading	Cronbach's alpha	Composite reliability	AVE
IOSI	0.903–0.938	0.954	0.965	0.845
NBMI	0.750–0.900	0.923	0.943	0.735
EBMI	0.788–0.872	0.941	0.952	0.712
PEU	0.863–0.936	0.868	0.918	0.737
IEU	0.829–0.905	0.880	0.920	0.794

Note: AVE, Average Variance Extracted; IOSI, IOS integration; NBMI, Novelty-centred business model innovation; EBMI, Efficiency-centred business model innovation; PEU, Political environmental uncertainty; IEU, Industry environmental uncertainty.

Table 3. Inter-construct correlations and average variance extracted.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. IOSI	4.727	1.481	0.919									
2. NBMI	4.833	1.299	0.738**	0.857								
3. EBMI	4.961	1.105	0.654**	0.706**	0.844							
4. PEU	5.071	1.248	0.308**	0.283**	0.418**	0.858						
5. IEU	4.914	1.344	0.483**	0.526**	0.458**	0.562**	0.891					
6. Size	–	–	0.010	0.149*	–0.007	–0.117	–0.058	–				
7. Age	–	–	–0.241**	–0.136	–0.213**	–0.186*	–0.236**	0.541**	–			
8. Manufacturing ^a	–	–	0.225**	0.264**	0.166*	0.066	0.108	–0.054	–0.157*	–		
9. IT ^a			–0.105	–0.127	–0.113	0.034	–0.053	0.156*	0.146*	–0.453**	–	
10. Service ^a			–0.149*	–0.156*	–0.075	–0.076	–0.056	–0.057	0.072	–0.556**		–
11. Ownership	–	–	0.172*	0.127	0.008	0.087	0.078	–0.073	–0.206**	0.164*	–0.041	–0.114

Note: Bold diagonal elements are the square root of the AVE.

* $p < 0.05$

** $p < 0.01$.

^aDummy variable.

Table 4. CFA results.

Model	χ^2	df	CFI	TLI	RMSEA	SRMR
Measurement model	210.106	94	0.958	0.946	0.082	0.043
Four-factor model	491.078	98	0.858	0.826	0.148	0.079
Three-factor model	663.353	101	0.796	0.758	0.174	0.090
Two-factor model	1034.292	103	0.662	0.607	0.222	0.142
One-factor model	1245.792	104	0.586	0.522	0.245	0.144

Abbreviations: CFI, comparative fit index; RMSEA, root mean-square error of approximation; TLI, tucker-lewis index; SRMR, standardised root mean square residual.

Note: Four-factor model: NBMI and EBMI were merged; Three-factor model: NBMI and EBMI were merged, and PEU and IEU were merged; Two-factor model: NBMI, EBMI, PEU, and IEU were merged. One-factor model: All items are merged.

factor model ($\chi^2 = 1245.792$, $df = 104$, $CFI = 0.586$, $TLI = 0.522$; $RMSEA = 0.144$) proved to be unacceptable and markedly inferior to those of the measurement model that included constructs ($\chi^2 = 210.106$, $df = 94$, $CFI = 0.958$, $TLI = 0.946$; $RMSEA = 0.082$). Though the fit indices of the model with both constructs and a method factor ($\chi^2 = 147.689$, $df = 78$, $CFI = 0.975$, $TLI = 0.961$; $RMSEA = 0.070$) marginally improved the model fit of the measurement model with only constructs, the path coefficients and their significance were similar between the two models, revealing that they were robust despite the inclusion of a common method factor (Flynn, Huo, and Zhao 2010; Liu et al. 2016). Therefore, we concluded that common method bias is not a serious problem in the study.

5. Analysis and results

5.1. Hypothesis testing

To test the research model, we conducted a hierarchical regression analysis to examine the relationship. To reduce worries about multicollinearity, we centralised the dependent variables, independent variables, and moderate variables before calculating the interaction terms (Aiken and West 1991). We also calculated the variance inflation factor (VIF) scores (1.019~1.693), which are all less than 10 (Hair et al. 1998), suggesting that multicollinearity was unlikely to be a serious problem in the current study. The regression results are shown in Table 5.

H1a and H1b was supported that IOS integration has a positive effect on NBMI/EBMI (Model 2: $\beta = 0.703$, $p < 0.001$; Model 5: $\beta = 0.647$, $p < 0.001$). The results verified H2a and H2b that IEU positively moderates the relationship between IOS integration and NBMI/EBMI (Model 3: $\beta = 0.121$, $p < 0.05$; Model 6: $\beta = 0.342$, $p < 0.001$). The result of Model 6 showed that PEU negatively moderates the

Table 5. Regression results

Variables	Novelty-centred business model innovation			Efficiency-centred business model innovation		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Size	0.305***	0.173**	0.154**	0.155	0.035	0.070
Age	-0.246**	-0.042	0.007	-0.283**	-0.096	-0.073
Ownership	0.062	-0.008	-0.001	-0.060	-0.124*	-0.139**
Industry1	0.164	0.101	0.052	0.109	0.051	-0.036
Industry2	-0.082	-0.027	-0.067	-0.053	-0.002	-0.097
Industry3	-0.054	0.006	-0.038	-0.012	0.043	-0.050
IOSI		0.703***	0.565***		0.647***	0.574***
PEU			-0.054			0.110
IEU			0.257***			0.128
IOSI*PEU			0.092			-0.144*
IOSI*IEU			0.121*			0.342***
R squared	0.149	0.578	0.651	0.084	0.447	0.584

Note: IOSI, IOS integration; PEU, Political environmental uncertainty; IEU, Industry environmental uncertainty; Industry 1, Manufacturing industry; Industry 2, IT industry; Industry 3, Service industry.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

relationship between IOS integration and EBMI, and supported H3b (Model 6: $\beta = -0.144$, $p < 0.05$). However, the result of Model 3 showed that PEU insignificantly moderates the relationship between IOS integration and NBMI (Model 3: $\beta = 0.092$, $p > 0.05$), and H3a was not supported. Moreover, in order to check the robustness, we divided the total sample into the high and low groups according to IEU and PEU, respectively (based on the average of IEU and PEU). Then in the high and low groups, we regressed between IOS integration and NBMI/EBMI to compare the significant difference of regression coefficients. The results are consistent and prove the robustness (NBMI: $T(\text{PEU}) = 1.45$, $p > 0.05$; $T(\text{IEU}) = 15.45$, $p < 0.05$; EBMI: $T(\text{PEU}) = -16.06$, $p < 0.05$; $T(\text{IEU}) = 30.28$, $p < 0.001$). Furthermore, in order to illustrate the moderating effect more explicitly, we show the simple slope tests (Aiken and West 1991) in Figures 2–4.

5.2. Analyses to address endogeneity

Considering the significant correlation between IEU/PEU and IOS integration, we need to exclude the influence of endogeneity on the results statistically. We examined the correlations between IOS integration and error term for the OLS model and the result is insignificant ($p > 0.05$) (Tang and Rai 2012). Then we performed Durbin-Wu-Hausman test (Davidson and MacKinnon 1993) to test endogeneity bias. First, we regressed IOS integration on IEU and PEU and obtained the residuals for them. Then we performed an augmented regression by including all the main effects and the two residuals of IEU/PEU. The regression results showed that the residual terms were insignificant, ($p > 0.05$) which indicates that endogeneity is unlikely to be an issue in the hypothesis testing.

We also conducted a Heckman two-stage model to further check the endogeneity problem caused by sample selection bias (Heckman 1979). First, we created a dummy variable according to the median of IOS integration, and we encoded the value as 1 if IOS integration is above the median, and as 0 if IOS integration is below the median. In the first stage, we used a probit model to regress the dummy variable on the control variables used in the study to obtain the inverse mills ratio (IMR). Then, we added IMR as an additional control variable to the original regression model to further examine the sample selection bias. Table 6 shows the results, which still support our hypotheses. IMR is not statistically significant, indicating that the endogeneity problem is absent in the study.

6. Discussion

The purpose of the study is to provide a thorough comprehension of the effect of IOS integration on the development of NBMI and EBMI, as well as to explore how these relationships are moderated by IEU and PEU. By matching data from the operational department and the IT department of 184 firms, we find that IOS integration significantly improves firms' NBMI/EBMI and the different moderating roles of IEU and PEU.

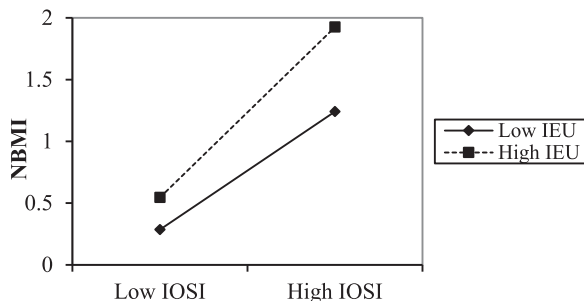


Figure 2. The moderating effect of IEU on the relationship between IOSI and NBMI.

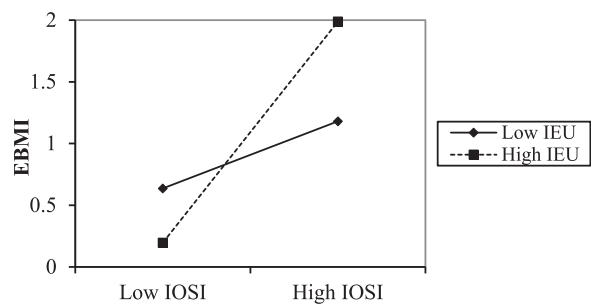


Figure 3. The moderating effect of IEU on the relationship between IOSI and EBMI.

6.1. Theoretical contributions

This study contributes to OIPT in two main aspects. First, researchers have indicated that BMI is an essential concept, yet it remains underexplored (Foss and Saebi 2017). Existing research examines both internal and external drivers of BMI, such as supply chain integration and digital technology, which mostly regards BMI as the result of resource accumulation and allocation from the perspective of resource-based view (Ancillai et al. 2023; Feng, Yang, and Sheng 2024; Foss and Saebi 2017). However, few studies have considered BMI as an information processing result and IOS integration as the path of information processing capability underlying OIPT. By investigating the role of IOS integration, this study replenishes previous literature that advocates more research perspectives on BMI (Feng, Yang, and Sheng 2024). Our results provide support that the use of IOS integration benefits the design of novel and efficient ways of transactions with supply chain partners. Based on this, we respond to the calls that firms should better utilise inter-organisational tools among supply chain partners (Feng, Yang, and Sheng 2024). This study verifies the applicability of OIPT in BMI research, provides a new path for the formation of BMI from the perspective of inter-organisation information processing, and broadens the application scope of OIPT.

Second, this study expands the OIPT by considering micro- and macro-level institutional environmental uncertainty as moderators for IOS integration-BMI information processing path. Although existing research has recognised the importance of the external environment in influencing organisational decision-making (Ancillai et al. 2023), there is still a lack of research on the contingency of the external environment in the formation mechanism of BMI leveraging IOS integration from OIPT (Yang, Geng, and Feng 2020). Meanwhile, existing scholars have pointed out that formal and informal social policy can affect the ease with which firms carry out BMI (Foss and Saebi 2017), despite the relative neglect of political contingencies in the field of information systems (Chen, Liu, and Chen 2022). It’s reasonable and scientific to study the contingency effect of IEU and PEU for IOS

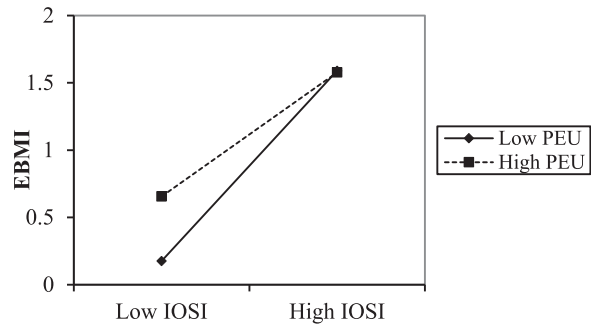


Figure 4. The moderating effect of PEU on the relationship between IOSI and EBMI.

Table 6. Heckman two-stage model results for addressing sample selection bias.

Variables	Novelty-centred business model innovation		Efficiency-centred business model innovation	
	Model 1	Model 2	Model 3	Model 4
Size	0.232	0.108	0.160	0.057
Age	−0.268	0.053	−0.391	−0.022
Industry1	−0.147	−0.038	−0.063	0.071
Industry2	−0.145	−0.036	−0.060	0.070
Industry3	−0.140	−0.040	−0.062	0.070
Ownership	0.127	0.029	0.247	0.135
IOSI	0.705***	0.577***	0.622***	0.562***
PEU		−0.048		0.110
IEU		0.232***		0.089
IOSI*PEU		0.010		−0.116*
IOSI*IEU		0.105*		0.301***
IMR	3.529	−0.823	4.906	−0.596
R squared	0.567	0.629	0.453	0.567

Notes: IOSI, IOS integration; PEU, Political environmental uncertainty; IEU, Industry environmental uncertainty; Industry 1, Manufacturing industry; Industry 2, IT industry; Industry 3, Service industry.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

integration-BMI. Our findings respond to scholars' appeals on the external environment respect and enrich the exploration of the contingency of the relationship between IOS integration and BMI (Ancillai et al. 2023). Through empirical research, the results show that IEU strengthens the relationship between IOS integration and NBMI/EBMI, and PEU negatively moderates the relationship between IOS integration and EBMI while moderating the relationship between IOS integration and NBMI insignificantly. One possible explanation may be the different core focuses between EBMI and NBMI. EBMI prioritises cost-efficiency, and NBMI places a stronger emphasis on innovative approaches regardless of cost considerations (Gerdoçi, Bortoluzzi, and Dibra 2018). NBMI focuses on external market and customer demand. In this condition, firms are less concerned with costs and more focused on innovative combination and resource utilisation. Moreover, some scholars have found that in an environment with high policy uncertainty, firms are more likely to carry out innovative behaviours to create new value to resist risks brought by policy uncertainty, such as developing new products (Engau and Hoffmann 2011). Thus, given the nature of NBMI, regardless of the change in the political environment, firms need to use IOS integration to obtain external market information and understand customer needs promptly to promote NBMI.

6.2. Managerial implications

This research also provides some implications for practitioners. On the one hand, IOS integration can mitigate the coordination problems among supply chain partners by acquiring and integrating new information in a timely manner. Managers should recognise the crucial role of IOS integration in facilitating interactions with supply chain partners and pay attention to the promotion of IOS integration for enhancing NBMI/EBMI. On the other hand, when firms leverage IOS integration for BMI, managers need to consider the influence of the external environment, including IEU and PEU. In the face of a dynamic industry environment, managers can decide to use IOS integration to overcome the market unpredictability by obtaining information among supply chain partners, thus better conducting NBMI/EBMI. In contrast, in a turbulent political environment, managers should consider adopting more conservative strategies and avoid relying heavily on IOS integration for EBMI. This judicious consideration of the external context is vital to ensure that IOS integration aligns effectively with the specific needs and challenges of the business environment.

6.3. Limitations and future directions

There are several limitations in the study. First, we only conducted research in China. Diverse global economic development and IT adoption underscore the importance of exploring various country contexts to enhance research generalizability (Ancillai et al. 2023). Second, the study only examines the moderating effects of external environmental factors on the relationship between IOS integration and BMI. In future studies, researchers may explore additional firm-level and environmental factors as contingencies (Ancillai et al. 2023). Moreover, IEU/PEU used in this study is subjective data perceived by managers in firms. Future studies can combine subjective and objective data for further exploration, such as using objective indicators to represent external environment, so as to break the limitation of subjective data. Finally, it's possible that some variables were omitted in our study, and we did not control for certain firm-specific heterogeneity. Therefore, future research could be designed longitudinally to examine the causal relationship between IOS integration and BMI.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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When differentiated empowering leadership improves team identification and individual work engagement: the combined roles of performance basis, team-member exchange, and employee self-efficacy

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Abstract

The extant research has primarily investigated the negative effect of differentiated empowering leadership (DEL) on either the individual or team-level outcomes, revealing little about the positive influence of DEL and rarely considering the dual-level effects. According to the legitimacy perspective, the performance basis is identified as a crucial factor in enabling DEL to confer benefits to the entire team and individual members simultaneously. Furthermore, the boundary effects of team-member exchange (TMX) and employee self-efficacy on the moderating process were examined. The cross-hierarchy and hierarchical regression methods were employed to analyze the multisource data from 78 Chinese teams. The findings revealed that (1) for the effect on the whole team, DEL was positively related to team identification when highly based on employee job performance, and the effect was stronger in the team with higher-quality team-member exchange; (2) for the effect on individual members, the relation between performance-based DEL and employee work engagement was positive for the high self-efficacy members but negative for the low self-efficacy members. These findings underscore the importance of DEL basis, team, and individual contexts for a comprehensive understanding of the impact of DEL.

Keywords Differentiated empowering leadership · Team identification · Work engagement · Legitimacy perspective

Introduction

Empowering leadership is essential for effective team management (Lorinkova et al., 2013). By sharing power and allocating autonomy to followers, team leaders' empowering behaviors are expected to motivate members and improve team efficacy (Cheong et al., 2019). However, team leaders can only empower some and not all members because of potential risks (Han et al., 2019). For instance, empowered members may make bad decisions because of a

lack of capacity (Wang et al., 2022). Therefore, differentiated empowering leadership (DEL) is inevitable and ubiquitous in empowered teams. DEL refers to the degree to which the same team leaders exhibit varying levels of empowering behavior toward different members (Biemann et al., 2015; Li et al., 2015). Given that DEL pertains to the distribution of power within the team, it has a considerable effect on both the team's key outcomes (e.g., team performance and team innovation) and the individual employee's outcomes (e.g., employee performance and behaviors) (Dong et al., 2023; Li et al., 2017; Lin et al., 2020; Zhu & Chen, 2016).

Despite the advances in DEL research, the growing body of literature has left two major research gaps. First, the positive effects of DEL are not fully understood. Early theoretical studies anticipated the beneficial functions that DEL would serve, such as ensuring a reasonable allocation of team power resources and avoiding the burden of empowering individuals who are unwilling to be empowered (Forrester, 2000). However, existing empirical studies have primarily examined the negative consequences of DEL, including

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its potential to reduce performance and innovation and to induce counterproductive behaviors (Dong et al., 2023; Li et al., 2017; Lin et al., 2020; Zhu & Chen, 2016). Furthermore, the negative effects are mitigated by high procedural justice within a team or high Chinese traditional orientation of members (Han, 2019; Li et al., 2017). In contrast, there is a paucity of studies examining the positive effects of DEL. Only Biemann et al. (2015) verified that DEL promotes individuals' career development behaviors. There is a lack of empirical evidence to explain how and when the positive effects of DEL occur, making it difficult to fully understand the influence of DEL and to effectively guide DEL practice.

Second, most previous studies focused on DEL's impact on either the team-level (Han, 2019; Zhu & Chen, 2016) or the individual-level outcomes (Biemann et al., 2015; Dong et al., 2023; Li et al., 2015; Lin et al., 2020), but rarely both. Team leaders are expected to improve team efficiency and motivate individual members simultaneously (Wang & Howell, 2010). This case is particularly challenging when team leaders treat members differently. Differentiated leadership can be beneficial to specific members because leaders allocate more resources to them than others. However, such leadership can also be harmful to the whole team because the differentiated treatment causes relational conflict (Kunze et al., 2016). To fully understand the impact of DEL and apply it effectively, both team-level and individual-level results should be considered (Wang & Howell, 2010). However, how to make DEL benefit both the whole team and individual members simultaneously is still unclear.

To address these gaps, our aim is to advance DEL research by drawing on the legitimacy perspective to explore the positive effects of DEL on teams and individual members. Existing research on DEL mainly adopts social categorization theory, social comparison theory, and organizational justice theory, arguing that DEL forms high/low empowered subgroups in teams, undermines members' perceived fairness, and causes intra-team competition and conflict (Dong et al., 2023; Han, 2019; Li et al., 2017; Lin et al., 2020). These theories can only explain the negative side of DEL, when DEL plays a positive role needs to be explained from a systematic theoretical perspective. Whether differentiated leadership is beneficial or harmful, the root cause is legitimacy (Han et al., 2021), referring to the belief that “authorities, institutions, and social arrangements are appropriate, proper, and just” (Tyler, 2006; p.376). Only being believed as legitimate by members, differentiated leadership can foster deference among members (Han et al., 2021). The legitimacy of differentiated leadership comes from its basis—the factors based on which team leaders behave differently toward different members (Chen et al., 2018). Followers' performance is one of the primary bases of differentiated leadership (Han et al., 2021). Differentiated

leadership behaviors based on members' performance are equitable and legitimate to improve team proactivity (Chen et al., 2018). Research on team power also suggested that “the legitimacy of power disparity is critical in determining whether functionalist or conflicts theories of power hold” (Tarakci et al., 2016), while little DEL research has focused on the legitimacy issue. Accordingly, this study draws on the legitimacy perspective to explore how the performance basis stimulates DEL's positive effect.

Performance-based DEL affects both team and individual members. From the perspective of the team as a whole, performance-based DEL optimizes the allocation of the team's power resources by relating each member's income (i.e., empowerment resources) to his or her inputs (i.e., job performance). Members perceive the leader as prioritizing the collective benefit of the team and respecting members' contributions. This is consistent with the relational criterion of legitimacy, which states that members will recognize leadership behavior as appropriate and legitimate if the leader ensures that members are treated with respect and receive outcomes commensurate with their rights (Taylor, 1997). Legitimate, performance-based DEL is supported by team members and also encourages members to identify with the team. Strong team identification serves as an “crucial enabler for team members' willingness to achieve common objective” (Huettermann et al., 2014; p. 413) and as “a form of team effectiveness” (Cheng & Wang, 2015; p. 640). From an individual perspective, performance-based DEL ensures that everyone has an equal opportunity to gain empowerment for self-development and growth. This would also allow members to recognize the legitimacy of DEL based on relational criteria. To take advantage of the opportunities offered by the performance-based DEL, members will be actively engaged in the work to win the performance competition. In addition to performance, work engagement positively predicts other key employee outcomes (Mazzetti et al., 2023). Therefore, this study expects that performance-based DEL will promote team identification and individual work engagement, two outcome variables that are highly valued in organizational research but have received little attention in DEL research.

Furthermore, the expected positive relations are contingent because performance-based DEL cannot always gain legitimacy. In addition to relational criteria, individuals also judge legitimacy based on instrumental criteria, which refers to the favorability or desirability of the outcomes obtained or expected from leaders' behavior (Tyler, 1997). Relational and instrumental criteria are combined to determine the legitimacy of judgment (Tost, 2011). As previously discussed, performance-based DEL meets the relational criteria. However, it does not necessarily meet the instrumental criteria. For the positive effect on team identification, the

major obstacle comes from the low-empowered members. These members obtain less than the high-empowered ones, such that they may perceive performance-based DEL as less legitimate and experience a weaker sense of team membership. Fortunately, resources from peers can compensate for the lack of leader support (Wang & Hollenbeck, 2019). We expect high-quality team-member exchange (TMX), characterized by mutual trust and support among members, to help relieve members' negative perceptions, particularly the low-empowered ones, and make the positive effect of performance-based DEL on team identification more possible. For the positive effect on individual work engagement, the possible hindrance is the challenge brought by performance-based DEL. The differentiated distribution system of empowering high-performers means survival of the fittest (Zhu & Chen, 2016). Only members with high self-efficacy will endorse the benefits of performance-based DEL because they have the confidence to win the competition. On the contrary, members with low efficacy may refuse to recognize the legitimacy of performance-based DEL for fear of losing in the competition. Therefore, we seek to include high member self-efficacy as a favorable context for performance-based DEL to promote employee work engagement.

Figure 1 presents the research model. In sum, based on the legitimacy perspective, this study contributes novel boundary conditions (performance basis, TMX, and self-efficacy) for the question of how to make DEL benefit both the whole team and individual members simultaneously.

Theoretical background and hypotheses

DEL in work teams

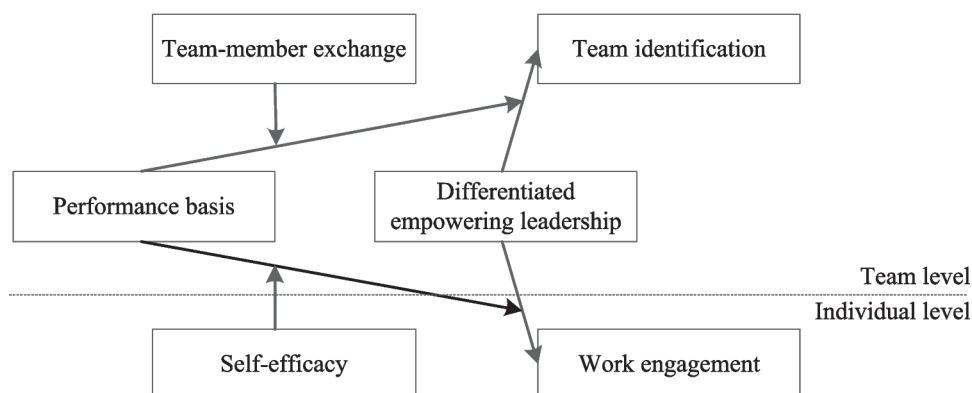
Referring to the research on leader-member exchange (LMX) differentiation and differentiated transformational leadership, Li et al. (2015) defined DEL as “the situation in which a leader distributes power, autonomy, motivation, and other job privileges unequally among followers” (p.

4). In contrast to the one-size-fits-all approach to empowerment, teams with DEL are characterized by varying levels of empowerment among team members. Team leaders tend to empower the members who help achieve team goals rather than those who may make mistakes or abuse autonomy (Wang et al., 2022), thereby leading to the formation of DEL within the team.

As DEL is increasingly recognized as a core feature of empowering leadership in teams (Biemann et al., 2015), researchers have attempted to explore its effects. Existing studies mainly find that DEL has negative effects on teams and individuals. At the team level, Zhu and Chen (2016) found that due to the unequal distribution of resources, DEL causes fierce competition within the team and destroys intra-team cooperation; Han (2019) showed that DEL causes subgroup categorization and lack of communication within the team, which reduces team potency and team performance; and high-level procedural justice or team-level empowering leadership helps to mitigate the negative effects of DEL. At the individual level, Li et al. (2015) proved that DEL violates egalitarianism, making it difficult for empowering leaders to increase followers' sense of responsibility, while this negative impact of DEL is weaker for followers with higher power distance orientation; Li et al. (2017) found that DEL causes members to reduce work engagement and performance and even engage in counterproductive behaviors because it destroys team justice, while the negative impact is weaker for followers with higher Chinese traditionality; Lin et al. (2020) found that DEL promotes feelings associated with “out-group” versus “in-group”, which inevitably creates intra-team relational conflict and leads to knowledge concealment; Dong et al. (2023) also proved that DEL violates follower OBSE and reduces follower performance because it causes high/low empowered individuals to engage in social categorization and social comparison.

Contrary to most empirical findings, early theoretical research advocates that team leaders implement DEL in anticipation of its positive effects, including ensuring a reasonable allocation of team power resources and avoiding overburdening individuals who do not want to be

Fig. 1 Research model



empowered (Forrester, 2000). Only a few empirical studies have verified the positive conclusion. For example, Bie-mann et al. (2015) proved that DEL promotes individuals' career self-efficacy because DEL provides followers with opportunities to gain more power, make them feel in control of their careers, and improve their career self-efficacy.

The impact of DEL on teams and individual members is significant and multifaceted. While the existing research has made significant progress, there remain two aspects of the issues that warrant further investigation. The first major aspect concerns the positive effects of DEL. With regard to influence effects, the negative consequences of DEL have been subjected to extensive scrutiny, whereas its positive effects have been the subject of relatively little investigation. With regard to the theoretical perspective, research has predominantly employed social categorization theory, social comparison theory, and organizational justice theory to explain the negative impact of DEL. A new theoretical perspective is required to explain its positive impact. With regard to boundary conditions, extant studies have primarily investigated the moderating role of external environmental characteristics, such as team and individual attributes, in the attenuation of the negative impact of DEL. When DEL has a positive effect, it needs more exploration, and the root cause of its different effects based on DEL itself (rather than external environmental characteristics) also needs more attention. The second important aspect concerns the level of research. DEL affects both team and individual members through the differentiated allocation of power resources within the team to followers. Its influence on both levels requires further investigation.

To address the above issues, based on the perspective of legitimacy, we introduce the performance basis of DEL as a key boundary condition to facilitate the benefits of DEL for the entire team and individual members. In particular, we focus on two crucial processes: team identification and individual work engagement. These processes have been largely overlooked in DEL research, despite their potential to enhance central outcomes. This study brings these two processes to the forefront and examines the positive effects of performance-based DEL on team identification and individual work engagement.

Legitimacy and performance basis of DEL

Institutional theory uses legitimacy to explain organization institutionalization and what is acceptable within social systems. On this basis, social psychology defines legitimacy in psychology to represent that authorities, institutions, or social arrangements are viewed as right, proper, and just (Tyler, 2006). Legitimacy exists in the thinking of people, leading collective members to defer voluntarily to

the authorities. Management without legitimacy can only rely on coercive power, which needs enormous resources to reward people for following the arrangement and punish those who violate the institutions. This inefficient management style can only influence external motivation. Conversely, legitimacy works by evoking individuals' internal motivation (Tyler, 2006). With high legitimacy, management norms are internalized as individuals' own desires, such that they become self-regulating, take the management norms as their motivational systems, and behave in expected ways. To make management more effective, authorities, such as team leaders, must convince followers that leaders' arrangement is legitimate and ought to be obeyed (Varty et al., 2021). This case is particularly necessary for differentiated leadership because whenever differences exist in social standing within teams, issues are raised about the legitimacy of the differences (Tyler, 2006).

While DEL research has not explicitly applied the legitimacy perspective, it actually implies the legitimacy logic. For example, Li et al. (2015) proposed that “highly differentiated empowering leadership may be incongruent with the cultural values of Chinese people” (p. 651). Li et al. (2017) further explained that “leaders who implement highly differentiated empowering behaviors may be regarded by their followers as having a low level of integrity and as being immoral” (p. 83). In these studies, whether it causes social categorization or undermines team fairness, the DEL is harmful because it is perceived by employees as incorrect, inappropriate, and lacking legitimacy. Research on LMX differentiation has embraced legitimacy theory as a key perspective to explain its impact, and can provide important reference for studying DEL from the legitimacy perspective. Chen et al. (2018) suggested that the conflicting views on the effect of LMX differentiation are attributed to its legitimacy. High legitimacy enables LMX differentiation to boost members' justice perception. Pan and He (2017) and Han et al. (2021) proposed that legitimate LMX differentiation promotes team performance by stimulating positive team processes, such as team cooperation. Furthermore, the legitimacy of differentiated leadership depends on its basis (Chen et al., 2018; Han et al., 2021; Pan & He, 2017). LMX differentiation based on follower performance or ability is perceived as legitimate because it ensures that high-performance or high-ability followers receive more resources. In comparison, LMX differentiation based on leaders' liking undermines legitimacy because it is viewed as leaders' deviant behavior and fostering politics in the team (Han et al., 2021). By analogy, in order to exert a positive influence, DEL needs to have legitimacy, which is dependent on the basis of differentiated empowerment.

Performance basis is one of the bases that can make DEL legitimate. Job performance describes the quantity

and quality of the job tasks performed by individuals (Welbourne et al., 1998). It reflects the overall individual contribution to teamwork (Han et al., 2021). We focus on members' job performance as DEL basis for two reasons. First, performance is one of the primary bases for resource-related differentiated leadership to gain legitimacy (Chen et al., 2018). DEL belongs to this type of differentiated leadership similar to LMX differentiation. They both describe how leaders allocate resources to different team members, thereby sharing the same potential risk of triggering intra-team competition and conflict. Referring to the LMX differentiation research, DEL based on members' performance or ability can gain legitimacy to avoid team conflict and ensure the effective use of power resources. Compared with the ability basis, which depends largely on the perception of the leader, the performance basis enables members to have a stronger sense of control over the future power distribution and thus is more likely to be viewed as legitimate (Pan & He, 2017). In addition, performance is highly diagnostic of one's competence (Wang et al., 2022). Second, performance is one of the most likely bases on which leaders empower followers. DEL aims to leverage limited power resources to promote members' self-leadership and work motivation (Biemann et al., 2015). DEL is more likely to achieve this by ensuring that top performers (i.e., high performers) share more of the power resources. A recent empowering leadership review has also proposed that leaders tend to empower high performers (Cheong et al., 2019).

The positive effects of performance-based DEL do not always happen because it does not meet both criteria of legitimacy. Leadership is viewed as legitimate based on relational criteria when it is perceived to affirm the social identity and self-worth of members, ensure that members are treated with respect, and receive outcomes commensurate with their entitlement. Leadership is viewed as legitimate based on instrumental criteria when it is perceived to facilitate members' favorable outcomes obtained or expected from leaders (Tyler, 1997). Relational and instrumental criteria are not mutually exclusive but simultaneously affect leadership legitimacy (Tost, 2011). Performance-based DEL meets the relational criteria because it provides an equitable chance for each member to be empowered with good performance, thereby making members feel accepted and respected. However, the instrumental criteria are not necessarily met. The low performers or members who are not confident about winning the performance competition will perceive that DEL adds no real benefits, and may even cause them to lose existing autonomy. Therefore, it is necessary to explore contexts to reassure these members. Co-worker support and personal resources can change members' perceptions of leadership (Burmeister et al., 2020). Thus, we postulate TMX and self-efficacy as team-level and

individual-level contexts, respectively, to moderate the effect of performance-based DEL.

Effects of performance-based DEL on team identification and work engagement

Team identification refers to the state that members identify with the team and perceive a “psychological merging” of self and team (Huettermann et al., 2014). Strong team identification is a critical team resource to mobilize collective action among members. It leads members to comply with team norms in their thoughts and behaviors unconsciously, contribute to the team interest, and even sacrifice their individual interests (Lin et al., 2017). Team identification has been verified to benefit the central team and individual outcomes (for review, please see Huettermann et al., 2014). The formation of team identification largely depended on effective leadership (Huettermann et al., 2014).

We postulate that performance-based DEL promotes team identification. From the perspective of the team as a whole, performance-based DEL optimizes the allocation of team power resources by relating each member's income (i.e., empowerment resources) to their inputs (i.e., job performance). This approach acknowledges members' contributions and ensures that high-performing members share more resources (Han et al., 2021). In such a team environment, members perceive the leader to have integrity and to prioritize the collective benefit of the team. This conforms to the relational criteria, so that DEL is considered appropriate and reasonable, i.e., legitimate. As a result, team members are willing to adopt and adhere to the principles of respect and equity that DEL has established (Zheng et al., 2021). As respect and equity evolve into shared team norms, members' recognition and appreciation of the team is continually enhanced (Ashforth et al., 2008). In addition, legitimate leader norms are likely to be internalized as the desires of members (Tyler, 2006). Legitimate performance-based DEL indicates that leaders are committed to team goals rather than individual interests, which leads members to learn from leaders and infer a team-oriented attitude. This case, in turn, activates members' collective level of self-concept, thereby developing a high level of team identification. Accordingly, we hypothesize the following:

Hypothesis 1: The relation between DEL and team identification is positive under a high-level performance basis of DEL but less positive under a low-level performance basis.

Employee work engagement refers to “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002; p.74).

Vigor indicates that employees have increased energy, mental resilience, and keenness for their work. Dedication represents that employees are inspired by and proud of their work. Absorption involves employees being engrossed in work so that time flies (Schaufeli et al., 2002). As a significant active state of employees, work engagement has been widely proven to benefit important individual outcomes, including employee performance (Huettermann et al., 2017). Leadership is one of the most direct and important factors affecting employee engagement (Breevaart & Bakker, 2018; Shehawy, 2022).

We note that performance-based DEL promotes individual work engagement. From an individual perspective, performance-based DEL allows individuals to achieve the outcomes they deserve. The principle that performance improvement leads to empowerment is open and transparent, and everyone has an equal opportunity to gain autonomy and participate in decision making (Biemann et al., 2015). This opportunity for empowerment is a pivotal resource for self-development and growth (Kim & Beehr, 2023). Therefore, employees realize that leaders fully respect employees' efforts when they delegate, and work under the guidance of such leadership behavior has prospects. This meets the relational criteria, so members generally approve of performance-based DEL and recognize the legitimacy of this leadership. Employees who are respected and treated legitimately by their leaders are more likely to recognize their self-worth and have more motivation to improve (Tyler, 1997). They are eager to be high performers, to take advantage of the opportunities offered by performance-based DEL by being committed to their work and devoting more energy to their job tasks. However, not everyone is empowered at a high level, and only high-performing members can share most of the power resources. Performance-based DEL brings difficulties that require great effort to overcome. Once overcome, however, the benefits come. This allocation principle creates challenge stress for team members (Cavanaugh et al., 2000). More challenge stress leads to individuals experiencing higher work motivation, so members are more engaged in work (Breevaart & Bakker, 2018). Therefore, we propose the following:

Hypothesis 2: The relation between DEL and work engagement is positive under a high-level performance basis of DEL but less positive under a low-level performance basis.

Moderating roles of TMX and self-efficacy

Hypotheses 1 and 2 are proposed on the basis of the assumption that performance-based DEL optimizes the allocation

of team power resources and provides every employee with an equal opportunity to be empowered. This upright leadership behavior respects the value of each team member, meets the relational criterion, and is therefore generally considered legitimate by members to benefit the whole team and individuals. However, in addition to the relational criterion, members also judge legitimacy with a functional criterion, estimating how much favorability they actually receive from the leadership behavior in the end (Tyler, 1997). Performance-based DEL would be more likely legitimate and beneficial if both relational and functional criteria are met (Tost, 2011). Unfortunately, performance-based DEL cannot make each member achieve a favorable outcome. Whether this leadership meets the functional criterion depends on specific contexts.

In terms of impact on the whole team, performance-based DEL violates the functional criterion largely because it causes team conflict. Members within the same team inevitably compare themselves to others (Lin et al., 2020). Even if the equity of performance-based DEL is recognized, the sense of inequality created by the comparison may still cause anger, envy, and frustration among low-empowered members. These negative emotions are core features of relational conflict. As a result, high performers receive leaders' empowerment but lose peers' support because of conflict, whereas low performers have neither empowerment nor peers' support. Sufficient support from leaders and peers is the most valuable job resource for employees (Wang & Hollenbeck, 2019). However, all members cannot gain the two favorable resources simultaneously in a performance-based DEL team. A harmonious, trusting, and respectful team environment is needed to buffer the conflict and curb the damage to functional criteria caused by performance-based DEL.

We suggest that TMX plays an important role in helping performance-based DEL to obtain legitimacy and benefit team identification. TMX at the team level indicates the general level of reciprocity quality among members within the team (Seers et al., 1995). It reflects that team members reach a consensus about the quality of social exchange relations with each other. Low-quality TMX indicates that member exchange is limited to formal jobs, members show low trust and concern for others, whereas high-quality TMX involves trust, respect, and support among members (Wang & Hollenbeck, 2019). Within a team with high-quality TMX, the positive interpersonal climate and mutual support keep low-empowered members from being jealous of high-empowered members. The latter will also assist the former with the resources from leaders for reciprocity (Burmeister et al., 2020). As a result, performance-based DEL is less likely to cause team conflict and instead promotes members to share benefits, such that most members obtain favorable

outcomes. Therefore, under the high-quality TMX context, performance-based DEL will not violate or even meet the functional criterion. Coupled with meeting the relational criterion, the role of performance basis in promoting the effect of DEL on team identification is more pronounced. We thus propose the following:

Hypothesis 3: The positive relation between DEL and team identification under a high-level performance basis of DEL is stronger when the quality of TMX is high (vs. low).

For the effect on individuals, performance-based DEL is likely to be perceived as putting insurmountable barriers to individuals and thus cannot be up to the functional criterion. Although performance-based DEL gives everyone access to power resources, only high performers can stand out and win this opportunity. Not all members feel confident about being a high performer (Lin et al., 2020). Those who feel it difficult to achieve high performance regard performance-based DEL as a hindrance stressor because it creates performance demands that these members perceive impossible to overcome and barely brings individual gains (Cavanaugh et al., 2000). By contrast, members who are confident in achieving high performance regard performance-based DEL as a challenge stressor because they believe they benefit from such leadership (Cavanaugh et al., 2000). Accordingly, how to be viewed as a challenge rather than a hindrance is the key for performance-based DEL to meet the functional criterion. Individuals appraise stressors differently and largely based on personality traits (Mazzola & Disselhorst, 2019). This study suggests self-efficacy as a key personality to determine whether performance-based DEL is regarded as challenging or hindering.

Considering that empowerment involves multiple tasks, we focus on general self-efficacy instead of specific self-efficacy. General self-efficacy is a subjective belief that one can perform successfully across various situations based on one's ability (Ozyilmaz et al., 2018). Members with high self-efficacy are more confident in their own abilities and have strong staying power and endurance in the face of difficulties (Korman et al., 2022). These members regard performance-based DEL as a positive challenge and an opportunity to obtain the desired autonomy. They feel certain that they can handle the performance demand through strong effort and perseverance (Ozyilmaz et al., 2018) and eventually win leaders' empowerment. Therefore, performance-based DEL meets the two legitimacy criteria well in the view of high self-efficacy members. They are motivated to engage in work to improve performance. By contrast, despite being aware of the opportunities brought by performance-based DEL, low self-efficacy members perceive

themselves as unable to cope with the performance demands to win empowerment (Ozyilmaz et al., 2018). They may even be afraid of losing existing resources because of losing the competition. Thus, for members with low self-efficacy, performance-based DEL violates the instrumental criterion of legitimacy and causes hindrance stress, such that these members are unwilling to engage in work. Accordingly, we propose that:

Hypothesis 4: The positive relation between DEL and work engagement under a high-level performance basis of DEL is stronger when the level of individual self-efficacy is high (vs. low).

Method

Procedures and participants

The survey was conducted in a central province of China. With the help of the local government bureau of industry and commerce, we contacted 30 companies selected from yellow pages directories using convenience sampling. Finally, 12 companies (including one real estate, three financial, four Internet, and four manufacturing companies) agreed to participate in the study. Ethical approval was obtained from the administering university.

Data were collected at two points in time, approximately six months apart. At time 1, the human resources department of each company helped us identify the teams with at least four members to participate in the survey. We then explained the purpose of the research and the requirements for collecting the questionnaires in detail to the team leaders and distributed a numbered envelope to each team leader, with each number representing one team. Each folder contained an introductory letter explaining that participation was completely voluntary, confidential, and anonymous, as well as a paper version of a questionnaire for team leaders asking them to provide demographic and team size information, the names of their direct followers, and to rate the performance of the direct followers listed. A completed questionnaire is returned in a sealed envelope and sent centrally by HR to the surveyor. A total of 105 questionnaires were distributed and 97 team leaders responded. Six months later, the 97 team leaders were asked to distribute envelopes to each of their followers whose names were on the list. Each envelope was labeled with the team number. Included in each folder was an introductory letter explaining that participation was strictly voluntary, confidential, and anonymous, and the paper version of the team member questionnaire asking them to provide their names and demographics,

and assessing empowered leadership, team identity, TMX, work engagement, and self-efficacy. A completed questionnaire is returned in a sealed envelope and sent centrally by HR to the surveyor. Completed responses were received from 508 members.

Previous research on teams has suggested that a team response rate of less than 60% may lead to measurement error and generate Type II errors (Timmerman, 2005). Therefore, following previous research on differentiated leadership (e.g., Chen et al., 2018; Li et al., 2015), we excluded teams with a response rate of less than 60%. To test for any bias that might result from using this response criterion, we correlated the within-team response rates of the teams in the final sample with all of the team-level variables in the model. None of these correlations were significant ($0.04 \leq r \leq 0.09$, n.s.), suggesting that bias due to within-team nonresponse was not a major concern. Finally, 78 member-leader pairs, including 474 followers and 78 direct leaders, were matched for data analysis. Table 1 presents the demographic information for the final sample.

Measures

Apart from the demographic information, all measures were taken from authoritative 5-point Likert-type scales (from 1 = strongly disagree to 5 = strongly agree). To avoid semantic discrepancies, all English measures were translated into Chinese and then back into English by different professors in the management field.

Work engagement

Followers rated their own work engagement using the three-item version of the Utrecht Work Engagement Scale (Schaufeli et al., 2019). Each item measured one dimension:

“At my work, I feel bursting with energy” (vigor), “I am enthusiastic about my job” (dedication), and “I am immersed in my work” (absorption). The Cronbach’s α was 0.86.

Self-efficacy

Followers rated their own self-efficacy using a ten-item scale from Schwarzer and Jerusalem (1995). A sample item was “I can remain calm when facing difficulties because I can rely on my coping abilities”. The Cronbach’s α was 0.86.

DEL

Followers rated the empowering behavior of their leaders using a twelve-item scale from Ahearne et al. (2005). The scale contains four dimensions: enhancing the meaningfulness of work, fostering participation in decision making, expressing confidence in high performance, and providing autonomy from bureaucratic constraints. Each dimension was measured with three items. A sample item was “My leader allows me to do my job my way”. The Cronbach’s α for the overall scale was 0.90. Following the method of Harrison and Klein (2007), DEL at team level was represented by the within-team coefficient of variation (CV). The CV was calculated by dividing the within-team standard deviation of empowering leadership by its mean score. A higher CV value represented higher DEL within the team.

Performance basis

First, team leaders rated the job performance of each member with a four-item scale from Welbourne et al. (1998). A sample item was “This employee has high quantity of work output”. The Cronbach’s α was 0.80. Then performance basis of DEL was assessed by measuring the coefficient of the bivariate correlation (r) between members’ job performance and the empowering leadership quality they perceived in each team (c.f. Chen et al., 2018). A high bivariate correlation indicates that employees’ job performance is highly related to the empowering leadership in the team. The higher the employee’s performance, the more empowerment they received from their leaders.

Team TMX

Followers evaluated TMX using a ten-item scale from Seers et al. (1995). Five items asked about the followers’ contributions to other members and the other five asked about what the followers received from other members. A sample item was “How well do other members of your team recognize your potential”. The Cronbach’s α for the overall scale was

Table 1 Sample demographic

Variable	Sub-group	Team members	Team leaders
Gender	Male (coded as 1)	69.41%	70.51%
	Female (coded as 0)	30.59%	29.49%
Age	< 21 years (coded as 1)	1.05%	2.56%
	21–30 years (coded as 2)	41.35%	10.26%
	31–40 years (coded as 3)	39.66%	35.90%
	41–50 years (coded as 4)	14.98%	44.87%
	> 50 years (coded as 5)	2.95%	6.41%
Education	High school or middle school (coded as 1)	8.86%	5.13%
	Two-year college degree (coded as 2)	32.70%	20.51%
	Bachelor’s degree (coded as 3)	50.42%	56.41%
	Master or higher degree (coded as 4)	8.02%	17.95%

n (leader) = 78, n (member) = 474

0.78. Then individual-level scores were averaged to represent team-level TMX. The RWG_{mean} , $ICC_{(1)}$, and $ICC_{(2)}$ were 0.90, 0.14, and 0.50 ($F = 2.01$, $p < 0.001$), respectively.

Team identification

Followers rated team identification using a six-item scale adapted from Mael and Ashforth (1992). A sample item was “When I talk about this team, I usually say ‘we’ rather than ‘they’.” Individual-level ratings were averaged to represent the team-level variable. The RWG_{mean} , $ICC_{(1)}$, and $ICC_{(2)}$ were 0.87, 0.12, and 0.46 ($F = 1.86$, $p < 0.001$), respectively.

The $ICC_{(1)}$ values of TMX and team identification were comparable to the median $ICC_{(1)}$ values of aggregated constructs reported in the organizational literature (0.12), while the $ICC_{(2)}$ values are lower than the recommended 0.70 because of the small team sizes. However, according to Chen and Bliese (2002), low $ICC_{(2)}$ values should not prevent aggregation if aggregation is justified by theory and supported by high RWG and significant between-group variance. In this study, TMX and team identification were theoretically defined as team-level constructs, and the RWG means for them also suggested good agreement. Therefore, we proceeded with aggregation to create team scores for team TMX and team identification using individual-level scores.

Control variables

At the individual level, we controlled for employee demographic variables (including age, gender, and education level). At the team level, following Biemann et al. (2015), team size and the team leaders’ demographic variables (including age, gender, and education level) were included to control for their possible influences on individual and team outcomes. Furthermore, in line with previous research on differentiated leadership (e.g., Chen et al., 2018), the empowering leadership mean within each team was also controlled.

Analytical strategies

Confirmatory factor analysis (CFA) was conducted using Mplus 7 to test the measurement model. An unmeasured latent method construct (ULMC) was also conducted with Mplus 7 to test the common method variance (CMV). The team-level effect of DEL on team identification was tested by SPSS 22. The cross-level effect of DEL on work engagement was examined by Hierarchical Linear Modelling (HLM) with HLM 7. The variance of work engagement at the team level was significant ($\chi^2_{(77)} = 129.51$, $p = 0.020$; $ICC_{(1)} = 0.10$), indicating the necessity of employing HLM

to account for team-level influence. All variables at the individual level (except gender) were centered at the grand mean to reduce collinearity between the team-level intercept and the slope terms.

Results

Measurement model results

We used the five-step approach suggested by Dye et al. (2005) to assess whether the data structure has cross-level applicability. A single-level analysis is conducted prior to the multilevel CFA. First, individual items were used as indicators for each variable. The CFA results showed a poor fit to the data ($\chi^2 = 2891.604$, $df = 930$, $RMSEA = 0.066$, $CFI = 0.787$, $TLI = 0.781$, $SRMR = 0.068$). The reason may be that the empowering leadership measure contains twelve items and the TMX measure contains ten items, so having many estimated parameters increases the risk of spurious correlations. Since item packages serve as more stable and approximate indicators of a latent construct (Baer et al., 2008), we created four item packages of Empowering Leadership based on its four sub-dimensions and two item packages of TMX based on its two dimensions to reduce the risk of spurious correlations. The CFA results after parceling empowering leadership and TMX show that the hypothesized measurement model with six separate latent variables produced an acceptable fit to the data ($\chi^2 = 892.783$, $df = 362$, $RMSEA = 0.061$, $CFI = 0.924$, $TLI = 0.907$, $SRMR = 0.062$), and also fit the data better than any alternative models ($p < 0.001$ for all chi-squared difference tests). This shows that the data structure in our study has satisfactory convergent validity and discriminant validity, which provides a model basis for testing multilevel data structure (Dyer et al., 2005).

We then investigated whether the proposed six-factor model has cross-level identity by performing multilevel CFA. It includes the following five steps: performing conventional CFA analysis on the sample total covariance matrix (S_T) (Step 1), estimating the between-group level variation (Step 2), perform a factor analysis on the sample pooled-within covariance matrix (S_{PW}) (Step 3), performing factor analysis on the sample between-group covariance matrix (S_B) (Step 4), and performing multilevel CFA (Step 5) (Dyer et al., 2005). Compared with the results of the conventional CFA analysis (step 1), the RMSEA and CFI results of the multilevel CFA are better ($\Delta RMSEA = 0.009$, $\Delta CFI = 0.032$). In terms of SRMR, the fit result of the between-group model provided by multilevel CFA ($SRMR_B = 0.064$) was significantly better than 0.101 based on the simple between-group covariance matrix (S_B)

analysis (Step 4), the fit result of the within-group model provided by multilevel CFA ($SRMR_W=0.065$) was also significantly better than 0.073 based on the simple pooled-within covariance matrix (S_{PW}) analysis (Step 3). The above results show that the multilevel model has a better fit to the data structure. Our proposed six-factor structure is an equivalent model at the individual level and the team levels, so that we can effectively avoid inference errors in the subsequent cross-level analysis.

The reliability and validity of the measurable variables were also examined. For reliability, the Cronbach's alpha of each measurable variable was above the recommended value (0.70), indicating acceptable reliability. For convergent validity, the composite reliability (CR) of the measurable variables was between 0.87 and 0.93, above the recommended value (0.60), and the average variance extracted (AVE) of the measurable variables was between 0.51 and 0.76, above the recommended value (0.60), indicating adequate convergent validity. For discriminant validity, we first compared the hypothesized model to models with fewer factors. The constrained models resulted in significant chi-squared differences as well as decreases in model fit indices relative to the hypothesized model, supporting the theoretical independence and discriminant validity of the measurable variables.

Common method variance testing results

The unmeasured latent method construct (ULMC) was conducted to test the CMV (Podsakoff et al., 2003). Specifically,

a first-order factor was added as a latent variable to be included in the hypothesized model for which the CFA was conducted, and the measurement items for each variable were allowed to have loadings on this factor. If, after controlling for the effect of ULMC in this way, the fit indices of the model at this point are not significantly better than they were before controlling for it, this indicates that the variables in the research model do not suffer from the problem of homoscedasticity bias. In our study, the model with ULMC showed a better fit to the data than the hypothesized model ($\Delta RMSEA=0.012$, $\Delta CFI=0.027$, $\Delta TLI=0.035$). However, the differences in the GFI and TLI indices were well below the recommended minimum cut-off of 0.05 to suspect CMV (Bozionelos & Simmering, 2022). Therefore, the effect of CMV did not pose a major threat to the internal validity of our study.

Descriptive results

Table 2 displays the descriptive results. At the individual level, employee job performance at Time 1 was significantly and positively related to empowering leadership at Time 2 ($r=0.12$, $p=0.089$), indicating that leaders empower followers based on followers' job performance, which supported the proposition of the concept of performance-based DEL.

Table 2 Means, standard deviations, and correlations

Variables	Mean	SD	1	2	3	4	5	6	7	8
Team level										
1. Team size	6.09	1.51								
2. Leader age	3.40	.85	.22*							
3. Leader gender	.72	.44	-.06	-.26*						
4. Leader education	2.87	.76	.12	.04	-.11					
5. Empowering leadership mean	3.70	.25	.03	.07	-.21	-.02				
6. DEL	.10	.06	.07	.06	.08	.17	-.47***			
7. Job performance basis	.05	.48	-.20	-.26*	.02	.05	-.06	-.08		
8. Team TMX	3.35	.24	.07	-.07	.00	.09	.56***	.19	.27*	
9. Team identification	4.09	.28	.15	.04	-.08	-.06	.20	.08	-.30**	-.04
Individual level										
1. Age	2.77	.82								
2. Gender	.69	.46	.12*							
3. Education	2.57	.76	-.10*	.01						
4. Empowering leadership	3.71	.46	-.06	-.01	.06					
5. TMX	3.36	.45	-.06	.07	.06	.48***				
6. Job performance	3.76	.53	-.00	.03	-.04	.12*	.10*			
7. Team identification	4.10	.49	-.08	-.05	-.02	.13**	.09*	.06		
8. Self-efficacy	3.60	.43	-.01	.06	.13**	.43***	.45***	.17***	.02	
9. Work engagement	3.94	.45	-.05	.01	.10*	.28***	.37***	.18***	.16***	.45***

n (leader)=78, n (member)=474. * $p < .05$; ** $p < .01$; *** $p < .001$

Hypothesis testing results

Table 3 shows the HLM results and the results of hierarchical regression analyses with SPSS. Model 2 and Model 9 in Table 3 show that DEL had no significant main effect on team identification ($\beta=0.24$, $p=0.072$) or employee work engagement ($\beta=0.06$, $p=0.094$), consistent with our assumption that the effect of DEL was contingent.

Hypothesis 1 stated that DEL will interact with its performance basis to promote team identification. Model 3 in Table 3 shows that the interaction between DEL and its performance basis was positively related to team identification ($\beta=0.28$, $p=0.018$). The simple slope analysis in Fig. 2 shows that DEL was significantly and positively related to team identification when the performance basis was 1 SD above the mean ($\beta=0.57$; $p=0.01$), whereas the relationship was not significant when the performance basis was 1 SD below the mean ($\beta=-0.03$; $p=0.25$). These results provided evidence for Hypothesis 1, indicating that a high-performance basis allows DEL to have a positive effect on team identification.

Hypothesis 2 proposed that DEL interacts with its performance basis to benefit employee work engagement. Model 10 in Table 3 shows that the interaction between DEL and its performance basis had no significant effect on work engagement ($\beta=-0.04$, $p=0.086$), rejecting Hypothesis 2. The relationship between DEL and follower work engagement is not affected by whether or not leaders use differentiated empowerment based on follower performance.

Hypothesis 3 predicted a positive effect of the three-way interaction between DEL, performance basis, and team TMX on team identification. Model 7 in Table 3 shows that the three-way interaction term was significantly and positively related to team identification ($\beta=0.27$; $p=0.017$). A simple slope analysis and a slope difference test were then both conducted (Table 4), and a three-way interaction plot was also created (Fig. 3). Only when both performance base and team TMX were high did DEL have a significant and positive effect on team identification ($\beta=0.66$; $p=0.008$). Even when the differentiation was high performance-based, when team TMX was low, DEL had no significant effect on team identification ($\beta=0.14$; $p=0.572$). When differentiation was low performance-based, regardless of the level of team TMX, DEL had no significant effect on team identification ($\beta_{\text{high team TMX}}=-0.40$, $p=0.154$; $\beta_{\text{low team TMX}}=-0.04$, $p=0.805$). These results supported Hypothesis 3, indicating that high TMX helps to enhance the positive effect of performance-based DEL on team identification.

Hypothesis 4 proposed a positive effect of the three-way interaction among DEL, performance basis, and self-efficacy on employees' work engagement. Model 14 in Table 3 indicated that the three-way interaction term was

significantly and positively related to work engagement ($\beta=0.12$; $p=0.043$). A simple slope analysis and a slope difference test were both conducted (Table 4), and a three-way interaction plot was also created (Fig. 4). Regardless of the level of employee self-efficacy, DEL had no significant effect on work engagement when the differentiation was low based on member performance ($\beta_{\text{high self-efficacy}}=0.04$, $p=0.576$; $\beta_{\text{low self-efficacy}}=0.05$, $p=0.308$). When the differentiation was highly based on member performance, whether the influence was positive or negative depended on employees' self-efficacy. Only for employees with high self-efficacy, a highly performance-based DEL had a significant and positive effect on employee work engagement ($\beta=0.22$; $p=0.054$). For employees with low self-efficacy, high performance-based DEL was significantly and negatively related to employee work engagement ($\beta=-0.34$, $p<0.001$). Taken together, Hypothesis 4 was supported, indicating that high employee self-efficacy enhances the positive effect of performance-based DEL on employee work engagement.

Robustness check results¹

Further post hoc analyses were performed. First, to address the possibility that the nonsignificant main effect was due to DEL's influence on our results being U-shaped or inverted U-shaped, the curvilinear effect of DEL was examined (Check 1). According to the results, this possibility was excluded. Second, the hypothesis was further tested without control variables (Check 2). The pattern of results was consistent with our main hypothesis testing. Third, alternative DEL measures were used to check the robustness of the results. In addition to the within-team coefficient of variation, DEL was also represented by the within-group variance (Li et al., 2015) or the standard deviation (SD) (Biemann et al., 2015). Regardless of whether variance (Test 3) or SD (Test 4) was used to represent DEL, the hypothesis testing results remained the same (with the exception of the marginally significant effect of variance-represented DEL on work engagement). Although these checks did not completely rule out the possibility of suppression, they provided confidence in the robustness of our main findings.

Discussion

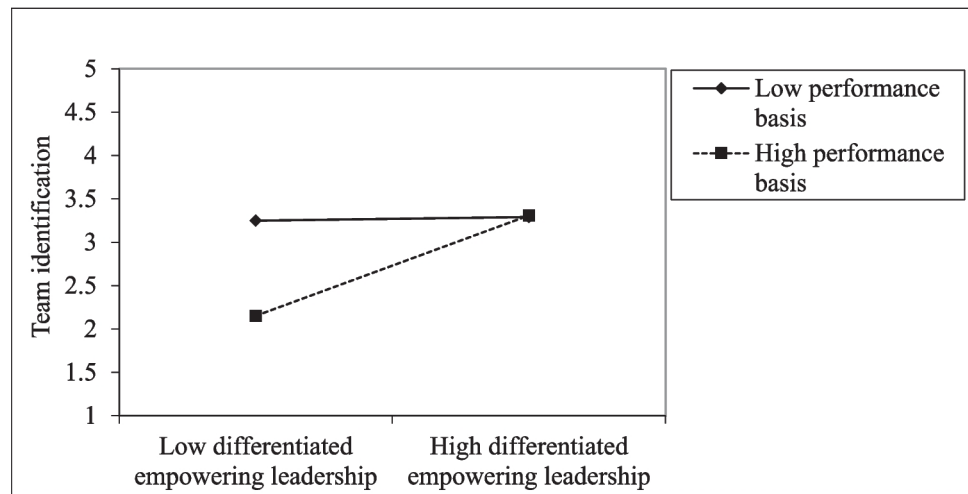
This study aims to resolve the question of whether and when DEL benefits the whole team and individual members. Drawing on the legitimacy perspective, we proposed that DEL promoted team identification at the team level and

¹ Please refer to the [supplementary materials](#) for detailed results.

Table 3 Results of the direct and moderating effect on team identification and employee work engagement

	Team identification					Employee work engagement								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Individual level														
Age								-.04	-.04	-.03		-.05	-.05	-.04
Gender								.00	.00	.00		.00	.00	.00
Education								.07	.08*	.07		.05	.06	.06
Self-efficacy												.36***	.37***	.36***
Team level														
Team size	.15	.14	.09	.11	.11	.10	.10	.07	.02	.06	.07	.07	.07	.06
Leader age	-.01	-.03	-.06	.00	-.11	-.06	-.05	.03	.02	.04	.03	.03	.04	.05
Leader gender	-.04	-.05	-.05	-.03	-.04	-.02	.01	.07	.07	.06	.06	.06	.06	.04
Leader education	-.08	-.12	-.11	-.10	-.08	-.07	-.12	-.03	-.04	-.04	-.02	-.03	-.03	-.03
Empowering leadership mean	.18	.30*	.31*	.32*	.42**	.43**	.46**	.03	.06	.05		.16**	.13*	.14**
DEL	.24	.30*	.30*	.33*	.25*	.30*	.26	.06	.06	.03		.02	.03	.00
Performance basis			-.27*		-.26*	-.20	-.15			.02			.02	.02
Team TMX				-.12	-.16	-.20	-.17							
Team identification										.16*				
Interaction														
DEL * Performance basis			.28*			.32*	.33**			-.04				-.06
DEL * Team TMX				.11		-.01	-.02							
Performance basis * Team TMX						-.11	-.03							
DEL * Performance basis * Team TMX							.27*							
DEL * Self-efficacy														
Performance basis * Self-efficacy											.08			.12*
DEL * Performance basis * Self-efficacy														.04
DEL * Performance basis * Self-efficacy														.12**

n (leader) = 78, n (member) = 474. * $p < .05$; ** $p < .01$; *** $p < .001$

Fig. 2 Interaction effect of DEL and performance basis on team identification**Table 4** Conditional effects of DEL on team identification and employee work engagement

Pairs of comparison	Team identification Slope	Employee work engagement Slope
1 (high performance basis, high team TMX)	.66**	.22*
2 (high performance basis, low team TMX)	.14	-.34***
3 (low performance basis, high team TMX)	-.40	.04
4 (low performance basis, low team TMX)	-.04	.05
Slope difference	T-value for slope difference	T-value for slope difference
1 and 2	5.77***	4.20***
1 and 3	12.56***	1.80+
1 and 4	7.82***	1.49
2 and 3	5.76***	-3.91***
2 and 4	1.31	-4.82***
3 and 4	-6.54***	-.13

n (team) = 78. ** $p < .01$; *** $p < .001$

work engagement at the individual level when it is based on team members' performance. The moderating influence of the performance basis of DEL was supposed to be magnified by TMX within the whole team and individual self-efficacy, respectively. The findings support the core part of our contingency model of DEL.

Theoretical implications

One of the important contributions is that our research adds to the knowledge of the positive role of DEL by examining its positive effects, exploring theoretical perspectives to explain the positive effects, and analyzing the boundary conditions for the positive effects.

First, we validated the positive effects of DEL on team identity, thereby contributing to a comprehensive academic understanding of the effects of DEL. Existing empirical studies have primarily examined the negative consequences of DEL, including its potential to reduce performance and innovation and induce counterproductive behaviors (e.g., Dong et al., 2023; Li et al., 2017). In contrast, early theoretical studies anticipated the beneficial functions that DEL would serve, such as ensuring a reasonable allocation of team power resources and avoiding the burden of empowering individuals who do not want to be empowered (Forrester, 2000). Our findings provide empirical support for Forrester (2000) and also underscore the importance of moving beyond the negative effects of DEL, revisiting the potential value of DEL, and attempting to explore the positive effects of DEL.

Second, we introduce a legitimacy perspective to explore the positive effects of DEL, which provides a new theoretical perspective to understand the effects of DEL. Existing research on DEL mainly adopts social categorization theory, social comparison theory, and organizational justice theory to explain the negative aspects of DEL (Dong et al., 2023; Han, 2019; Li et al., 2017; Lin et al., 2020). When DEL plays a positive role, it needs to be explained from a systematic theoretical perspective. We introduced the legitimacy perspective to add a new perspective to explore the positive role of DEL. Based on the legitimacy perspective, DEL can gain legitimacy, be recognized and accepted by team members, and play a positive role as long as the relational and instrumental criteria are met. How these two criteria are met depends on the basis of DEL (e.g., members' performance). This finding inspires DEL research, or more broadly, other differentiated leadership studies, to explore more bases for legitimizing differentiated leadership in order to enrich research on its positive effects. Moreover, the legitimacy perspective can resolve the theoretical debate on whether the

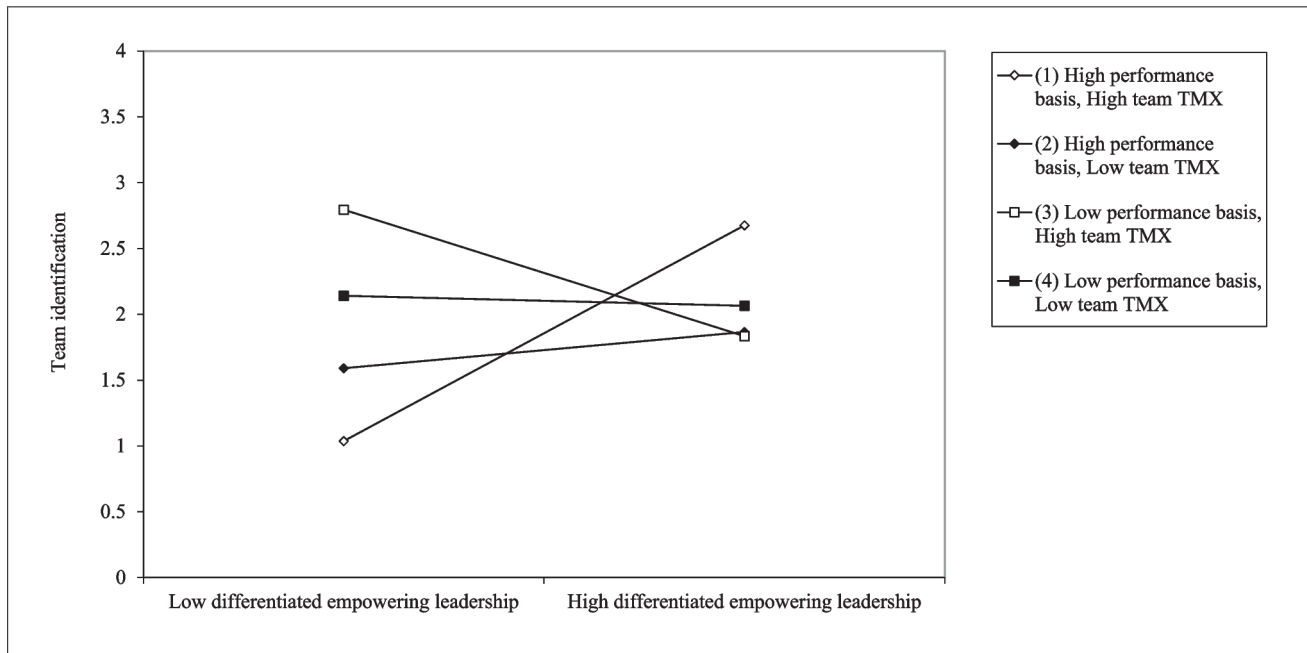


Fig. 3 Three-way interaction among DEL, performance basis, and team TMX on team identification

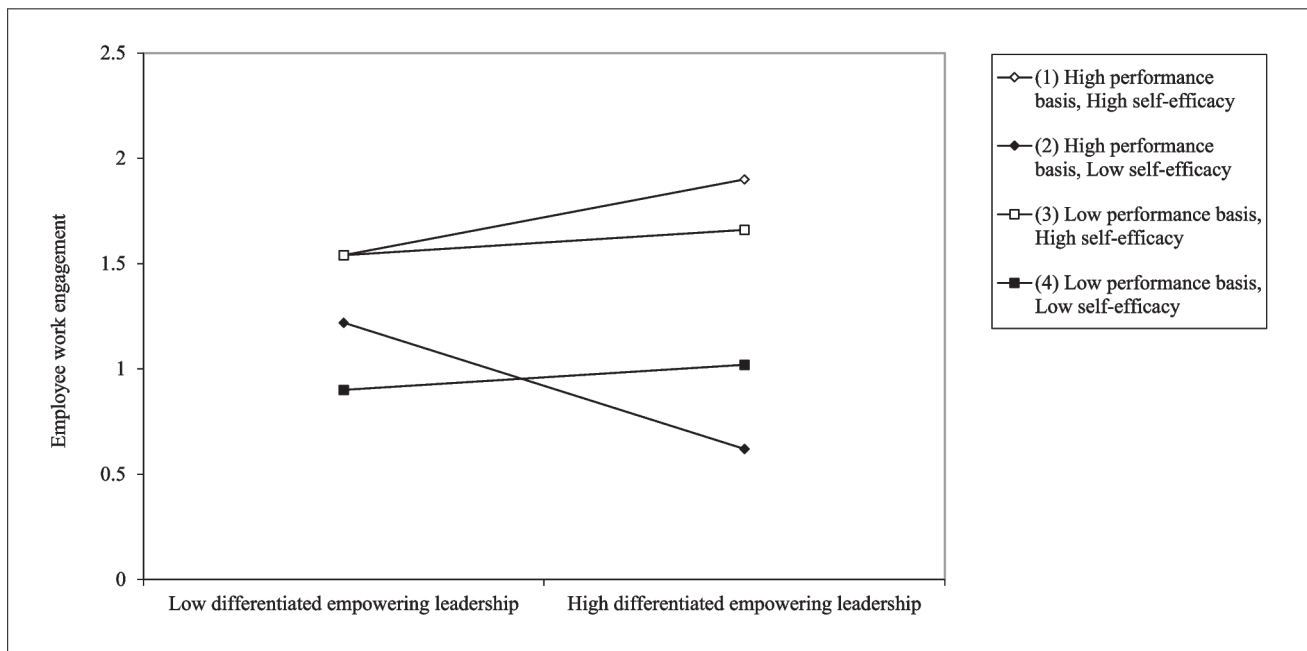


Fig. 4 Three-way interaction among DEL, performance basis, and self-efficacy on employee work engagement

role of DEL is positive or negative. Based on followers' performance or similar employee input-related bases (e.g., ability), DEL is legitimate and has a positive effect. When DEL is based on non-employee-input-related bases (e.g., leader's personal liking), we can infer that conflict arises because such DEL violates legitimacy and is rejected by members (Chen et al., 2018; Han et al., 2021; Pan & He, 2017). DEL and many other types of differentiated leadership are not

inherently evil. The conflicting theoretical perspectives and inconsistent findings on their positive and negative effects are fundamentally due to the legitimacy of leadership, which is determined by the basis of differentiation.

Third, based on the legitimacy perspective, we tested the critical role of the performance basis for the positive role of DEL, and gained a deeper understanding of the underlying reasons for the positive effect of DEL from the DEL

behavior itself. Unlike previous studies that focused on external environmental characteristics, such as team and individual characteristics, as boundary conditions for the role of DEL (e.g., Li et al., 2017), we focused on the empowering behavior itself and considered its performance basis to verify the positive effect of performance-based DEL on team identification. Our findings are consistent with Li et al. (2015), who proposed that when differentiation is based on follower performance, members are more likely to maintain positive attitudes toward DEL. Furthermore, the view that empowering leadership involves potential risks has been widely adopted in the empowerment literature. For example, empowered individuals may make mistakes or perform tasks at a low level. Therefore, leaders may empower some (e.g., high-performing or high-capability followers) but not all followers to avoid risks and take an active role in empowering leadership (Han et al., 2019; Wang et al., 2022). The present study supports this assumption. Team leaders allocate autonomy based on members' performance, and the resulting DEL benefits the team. It is not only the external context in which leaders perform DEL, which has been a dominant focus of previous research, but also how DEL is formed that determines the direction of DEL's effect on team outcomes.

Fourth, we also considered team-level TMX and individual-level self-efficacy as external environmental moderating variables, respectively, to complement a comprehensive understanding of the context under which DEL's positive role is played. We found that for the high self-efficacy individuals, performance-based DEL positively affects work engagement. Performance-based DEL builds an equitable allocation principle of "more power for higher performers". It facilitates the efficient use of team power resources, but not all members are happy to accept it. Self-interest causes "greater contributors to prefer equity and lesser contributors to prefer equality" (Cook & Hegtvædt, 1983; p. 223). Members who feel they cannot contribute much may expect leaders to distribute autonomy equally rather than differentially. This may explain why the main effect of performance-based DEL on individual work engagement is not significant. Thus, it is necessary to consider the moderating role of employee self-efficacy. Members with high self-efficacy are confident that they can make a greater contribution, approve of performance-based DEL, and view it not only as a challenge but also as an opportunity. Thus, they engage in the work to gain autonomy. While members with low self-efficacy lack confidence, they perceive little benefit from performance-based DEL. They are unwilling to engage in the work. At the team level, performance-based DEL promotes team identification in teams with high TMX, but not in teams with low TMX. This result, together with the three-way interaction effect on individual work engagement, illustrates that although the

basis of differentiation is key to determining the influence of DEL, the contextual roles of the external team and individual characteristics still need to be considered. This finding is consistent with previous DEL research, which verified that team and individual characteristics moderate the effects of DEL (e.g., Li et al., 2017). Our findings advance the literature by considering both the characteristics of DEL itself (i.e., the DEL basis) and the external team and individual characteristics simultaneously to provide a complete picture of the context in which DEL operates.

The other contribution is that our research enriches knowledge of the effects of DEL by simultaneously examining its effects on team identity at the team level and work engagement at the individual level.

First, we construct complete and accurate pictures of levels of influence by examining how DEL benefits teams and individuals simultaneously. Previous research on DEL usually focused on either the individual or team level but rarely both and also had a negative view of DEL's influence. How can DEL benefit both the team and the individual simultaneously is unknown. Most studies on differentiated leadership believe that differentiation motivates individuals but negatively affects team outcomes (e.g., Kunze et al., 2016). The only study that found a positive effect of DEL was on individual outcomes (Biemann et al., 2015). This study advances previous research by finding that legitimate DEL promotes both team identity and individual work engagement simultaneously under specific contexts.

Second, the two outcomes (i.e., team identification and individual work engagement) also help to expand the nomological network of DEL. Most previous research considered DEL to be harmful and therefore focused on its negative team and individual outcomes while underpaying attention to important positive outcomes, such as team identification and individual work engagement. We found that DEL was beneficial for these two outcomes in specific contexts, thereby helping to understand the positive effects of DEL. By exploring DEL's positive influence on team identification, this study provides evidence to Liang et al. (2022), who proposed that members "have stronger identification with their work groups" once they recognize differentiated leadership behaviors (p.13). By modeling the impact of DEL on work engagement, we enrich the research on the impact of team-level empowerment leadership on individual work engagement. Moreover, team identification and work engagement contribute to performance and non-performance outcomes (Huettermann et al., 2017). Therefore, taking them as dependent variables in this research provides a bridge to understanding the impact of DEL on a wide range of outcomes, including performance and non-performance.

Practical implications

Our findings provide valuable implications for organizations on how to empower effectively in the process of team management.

The findings of this study provide valuable implications for organizations on how to empower effectively in the process of team management. Because members have different abilities to hold power and willingness to be empowered, a team leader may need to create different levels of empowerment among team members (Han et al., 2019). However, the existing empirical studies mostly find that DEL destroys equality and causes team conflict (e.g., Li et al., 2017; Lin et al., 2020), which makes the leader hesitant to apply DEL. We propose that the ultimate consequences of DEL depend on how the leader differentiates among team members. If leaders base DEL on followers' job performance, members will recognize the legitimacy of DEL and support this differentiated leadership behavior. Accordingly, team leaders should recognize that there is nothing inherently wrong with DEL. The key point for leaders to focus on is to equitably differentiate empowerment based on follower performance and ensure that higher performers receive more empowerment. This helps foster team identification without compromising employee engagement. HR departments are suggested to train team leaders to legitimize their DEL, establish monitoring mechanisms for leader empowerment (e.g., CEO mailbox), and complete performance evaluation mechanisms to help team leaders identify high-performing employees.

Our study also finds that high team TMX and high employee self-efficacy enhance the positive effect of performance-based DEL. Therefore, when the quality of team TMX is high or the level of subordinates' self-efficacy is high, it is recommended that managers implement performance-based DEL. However, managers should pay attention to the fact that performance-based DEL reduces the work commitment of employees who have a low level of self-efficacy. It is necessary to implement a series of measures to promote team TMX and employee self-efficacy. To facilitate the quality of TMX, team leaders can place more emphasis on task-oriented exchanges and cooperation among members when assigning tasks; the HR department can organize team-building activities such as picnics, parties, and sports activities to maximize the potential of relationship-oriented exchanges among members (Tse & Dasborough, 2008). To improve team members' self-efficacy, team leaders can provide more opportunities for members to challenge themselves, set a positive example, and give timely praise to members for their achievements (BarNir et al., 2011). HR departments need to provide learning and training opportunities for employees to meet

employees' needs for self-actualization and to build self-efficacy. Individual members, especially those who desire autonomy, are suggested to take advantage of favorable conditions to improve their self-efficacy and seize the opportunity to be empowered.

Limitations and future directions

Despite the contributions, several limitations should be noted, highlighting significant avenues for future research.

In the aspect of developing the theoretical model, first, based on the legitimate perspective, this study theorized that performance basis enables DEL to gain legitimacy, such that DEL and performance basis interact to benefit teams and individuals. However, we did not measure the legitimacy mechanism directly. Future researchers can directly measure DEL's legitimacy and investigate the impact of performance basis on DEL's legitimacy, to provide empirical evidence for the application of the legitimacy perspective. Second, leaders can use other factors (e.g., follower proactivity) to determine empowerment except for follower performance. Future research can scrutinize more bases of DEL and examine their moderating roles in the effects of DEL on the team and individual outcomes.

In the aspect of hypothesis testing, first, given that most of the variables were self-reported by team members at time 2, CMV has to be considered when interpreting our findings. We have tried to reduce the CMV by using leader-reported job performance at time 1. CMV test results with ULMC also indicate that CMV is not a serious concern in this study. Moreover, all the studied team-level variables are aggregated from the individual-level data to reduce the bias resulting from individual-level data. Furthermore, our hypothesis testing was all about interactive effects, which are thought to be robust against CMV (Han et al., 2021). Future research can check our model by introducing alternative measurement strategies, such as objective performance and teammate-reported TMX. Second, the nearly cross-sectional data prohibit us from establishing causal inferences. Future research is encouraged to develop longitudinal or experimental designs to confirm the causal relationships.

Conclusion

Managers and researchers have paid increasing attention to empowered leadership, expecting to promote employees' self-leadership and improve team efficiency through empowerment. Team leaders tend to exhibit different empowering behaviors toward different members to avoid risks. Research on DEL generally confirmed its negative impact. This research shifts the focus to how to make DEL

play a functional role. Our results show that performance-based DEL benefits team identification within the team with high-quality TMX and promotes work engagement for the members with high self-efficacy. This study highlights the importance of distinguishing the different inputs based on which DEL is formed to have a deeper understanding of DEL's effect in future research.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12144-024-07107-w>.

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Data availability The datasets generated and analyzed during the present study are available from the corresponding author upon reasonable request.

Declarations

Ethical approval All procedures performed in this study involving human participants were in accordance with the ethical standards of the China Association for Science and Technology and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare that this study has no conflict of interest.

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RESEARCH ARTICLE

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Determinants of social enterprise performance: The role of passion, competence, and organizational legitimacy

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Abstract

Social enterprises have been widely recognized as tools to solve societal problems. As the soul of social enterprises, social entrepreneurs help social enterprises overcome resource constraints and achieve survival and development. However, existing studies have focused limited attention on the effects of social entrepreneur characteristics on social enterprise performance. Drawing on the institutional logics perspective, this paper constructs a theoretical model of social entrepreneurial passion and entrepreneurial competence affecting social enterprise performance through organizational legitimacy and examines the moderating effect of regulatory uncertainty. Data were collected from 198 social enterprises in China. The results indicate that organizational legitimacy mediates the relationships between social entrepreneurial passion, entrepreneurial competence, and social enterprise performance. Regulatory uncertainty positively moderates the relationship between organizational legitimacy and social enterprise economic performance. The findings of this study contribute to research on social enterprise performance and organizational legitimacy. This paper also offers practical suggestions that social entrepreneurs should exert their passion and competence, obtain organizational legitimacy, and analyze the institutional environments to promote the development of the enterprise.

KEYWORDS

entrepreneurial competence, organizational legitimacy, social enterprise, social enterprise performance, social entrepreneurial passion

1 | INTRODUCTION

Social enterprises have flourished around the world as tools to solve social ills and promote social well-being. As a hybrid form of for-profit and nonprofit organizations, social enterprises pursue social missions through commercial operations (Liu et al., 2015; Wang et al., 2015). In recent decades, the development of social enterprises around the world has faced some difficulties. In developed countries, such as the U.S. and the UK, although supported by comprehensive policies of governments, social enterprises are under increasing political and economic pressure to obtain resources from various sources and reduce their dependence on governments (Defourny & Nyssens, 2010; Liu et al., 2015). In China, social enterprise is still a novelty, and there is a lack of clear legislative frameworks for social enterprises (Yin & Chen, 2018). Considering that China is an emerging economy with underdeveloped institutional infrastructures, Chinese social enterprises often suffer from insufficient supportive regulations, conflicting institutional demands, and closed embedded networks, which makes the challenge of the resource constraints they face particularly salient (Bhatt et al., 2019; Xing et al., 2020). In early 2020, more than 65% of social enterprises in China were in operation trouble (Research report on the survival of Chinese social enterprises, 2020). Therefore, it is essential to explore how social enterprises overcome resource constraints, tackle competing institutional demands, and achieve long-term development.

This study investigates internal and external factors related to social enterprise performance, specifically within an uncertain resource environment. From an internal perspective, social entrepreneurs are the soul of their enterprise. Social entrepreneurs play a crucial role in resource acquisition, social network building, and performance improvement of social enterprises, and they enable social enterprises to innovate and gain recognition under institutional constraints (Agarwal et al., 2020; Ko et al., 2019). Previous research has identified organizational drivers of social enterprise performance (Glaveli & Geormas, 2017; Liu et al., 2015), yet limited attention has been given to the effects of social entrepreneur characteristics (Liang et al., 2015; Shin & Park, 2019). Scholars have called for greater insights into the following questions: what characteristics and qualities should social entrepreneurs possess to promote social enterprise development? What are the paths they take to make their social enterprise successful (Bornstein, 2007; Kimakwa et al., 2021; Stephan & Drencheva, 2017)?

This study helps answer this call by first asking how two specific entrepreneur traits identified in the literature influence social enterprise performance. Prior work suggests that social entrepreneurial passion and entrepreneurial competence are two key characteristics of social entrepreneurs that are important to social enterprise success, including opportunity identification and network development (Chandler & Hanks, 1994; Ho & Pollack, 2014; Thorgren & Omoredede, 2018). From the institutional logics perspective, social enterprises must conform to the requirements of multiple institutional expectations for legitimacy; otherwise, they jeopardize the long-term survival of the organizations (Pache & Santos, 2013; Thornton & Ocasio, 2008). Following prior literature, we expect entrepreneurs' passion and entrepreneurial

competence to facilitate the acquisition of legitimacy through commercial and social welfare logics, leading to greater enterprise performance in a market characterized by institutional and resource uncertainty (Besharov & Smith, 2014; Wang & Zhou, 2020). We specifically expect social entrepreneurs' passion and entrepreneurial competence to promote social enterprise performance by enhancing organizational legitimacy.

Importantly, we also expect organizations' external environments to influence the relationship between legitimacy and performance. Prior work has shown that institutional environments influence the operations of social enterprises (Desa, 2012; Meyer & Rowan, 1977). The interaction of organizational factors and institutional characteristics generates variation in organizational performance (Besharov & Smith, 2014). In China, the regulation of social enterprises is fragmented and ambiguous (Bhatt et al., 2019). The local governments and industry associations in different regions have distinct requirements on the business field, beneficiaries, service content and quality, and profit distribution of social enterprises, resulting in differentiation in the levels of regulation. Regulatory uncertainty, the perception of regulatory instability, is a key indicator of the institutional environment (Dutt & Joseph, 2019). Existing studies have contradictory viewpoints on the role of regulatory uncertainty in the process of exerting organizational legitimacy and improving performance. Some studies have suggested that regulatory uncertainty raises the risk of operation and reduces the effectiveness of legitimacy (Adomako & Tran, 2022), while others have argued that regulatory uncertainty increases organizations' dependency on their stakeholders and amplifies the importance of legitimacy (Wang & Libaers, 2016). In the context of social enterprises, how regulatory uncertainty acts as a contingency that accounts for the differentiated effects of legitimacy on enterprise performance remains unclear. Therefore, this study's second research question examines the moderating role of regulatory uncertainty in the relationship between organizational legitimacy and social enterprise performance.

2 | LITERATURE REVIEW AND HYPOTHESES

2.1 | Institutional logics perspective

The institutional logics perspective has emerged as a branch of institutional theory since the 1970s (Friedland & Alford, 1991; Meyer & Rowan, 1977; Thornton & Ocasio, 1999). Institutional logics were defined as "socially constructed, historical patterns of material practices, assumptions, values, beliefs and rules" (Thornton & Ocasio, 1999, p. 804). According to Friedland and Alford (1991), each of the core institutions of society (e.g., markets, corporations, industries, states, and families) provides a distinct institutional logic for social actors that guides their rational actions. Individuals, groups, and organizations are embedded in environments consisting of multiple logics. They elaborate, adopt, and manipulate these logics based on their own pursuits (Beagles, 2022; Besharov & Smith, 2014; Thornton & Ocasio, 2008). In general, the institutional logics perspective links micro individual or organizational behaviors with macro institutions (Meyer & Rowan, 1977; Thornton & Ocasio, 2008). It emphasizes the multiplicity of institutional logics and helps to explain the heterogeneity of organizations in complex institutional contexts (Basco, 2019).

Previous research on institutional logics has found that entrepreneurs' characteristics can determine the utilization of institutional logics and then affect the support and legitimacy derived from stakeholders (Pache & Chowdhury, 2012). For example, social entrepreneurship

education enables nascent entrepreneurs to acquire the skills of combining competing institutional logics, which helps them gain legitimacy and ultimately benefits the creation of innovative strategies (Pache & Chowdhury, 2012). Lone founders are likely to obey entrepreneurial logics to meet the expectations of market-oriented stakeholders, while family owner-managers tend to follow family logics to cater to family stakeholders (Miller et al., 2011). The opportunity-oriented and family-oriented entrepreneurs of family businesses behave differently in organizational practices, strategies, and performance under market and family logics (Basco, 2019).

Social enterprises, as hybrid organizations, always confront logic multiplicity in organizational practices (Besharov & Smith, 2014). Considering that social enterprises have the dual goals of creating social and economic value, they follow two core institutional logics: commercial and social welfare logics (Besharov & Smith, 2014; Pache & Santos, 2013). Commercial logics refer to the logic that social enterprises follow market-based principles and gain financial income through commercial operations. Commercial logics require social enterprises to provide quality products and services for customers and create economic value based on self-interest, competition, efficiency, and profit creation (Im & Sun, 2015; Thornton et al., 2012). The social welfare logics of social enterprises are used to solve social problems and create social value. Such logics encourage social enterprises to address social, environmental, or community issues and display moral appropriateness based on these institutional expectations (Im & Sun, 2015; Pache & Chowdhury, 2012; Pache & Santos, 2013). Following commercial and social welfare logics can help social enterprises gain the endorsement of a wide set of stakeholders, such as customers, industrial cooperators, local governments, communities, and funders (Vickers et al., 2017).

Transitional and emerging economies, such as China have undergone tremendous institutional and social changes. Social enterprises exposed to such complicated environments are urged to respond to multiple institutional demands and adopt hybrid institutional logics (Xing et al., 2020). In this study, we propose that social entrepreneurs' passion and entrepreneurial competence help them gain organizational legitimacy according to commercial and social welfare logics, ultimately improving social enterprises' social and financial performance.

2.2 | Social enterprise performance

Social enterprises pursue a balance between economic objectives and social missions (Liu et al., 2015). In contrast to traditional nonprofit organizations, social enterprises adopt business operations to realize sustainable development, and the economic value they create is geared toward the achievement of social missions (Wang et al., 2015). As a hybrid form of for-profit and nonprofit organizations, social enterprises must consider creating social and economic value simultaneously. Social value includes environmental protection, an increase in social welfare, an increase in employment for disadvantaged groups, and so on. Thus, the evaluation of social performance focuses on the number of beneficiary objects and the range of service regions (Liu et al., 2015). Economic value, which is often measured by financial performance, refers to the increase in market share and the number of customers. It is the premise of social enterprises' survival and self-sustainability (Liu et al., 2015).

Most studies have focused on the organizational factors that drive resource acquisition and performance enhancement in social enterprises, such as marketing capabilities (Liu et al., 2015), market and strategic orientation, and business model innovation (Wang & Zhou, 2020). However, limited attention has been given to the roles of social entrepreneur

characteristics. For example, Liang et al. (2015) found that the Big Five personalities of social entrepreneurs influence social enterprise performance, and different personalities have distinct effects on performance. Shin and Park (2019) suggested that social entrepreneurs' value orientation will affect social enterprise performance through social entrepreneurship. Kimakwa et al. (2021) theoretically proposed that social entrepreneur servant leadership improves social venture performance.

2.3 | Organizational legitimacy

Organizational legitimacy refers to the perception and evaluation by stakeholders of whether the actions of an organization conform to some socially constructed system of its norms, values, and beliefs (Certo & Hodge, 2007). Previous studies argued that when an organization accords with the norms of institutional environment or conforms to social norms and expectations, it gains organizational legitimacy (Scott, 1987). Research contends that organizational legitimacy is shaped by the perception and judgment of different types of stakeholders (Lamin & Zaheer, 2012). Stakeholders evaluate whether an organization's behavior meets social expectations, and this process is affected by institutional environments and organizational factors (Wang & Zhou, 2020).

In the context of social enterprises, organizational legitimacy is defined as the congruence between an organization's actions and its stakeholders' expectations of its performance according to their judgments of stakeholders (Huybrechts & Nicholls, 2013; Marshall & Macdonald, 2016). The development of social enterprises requires the participation of multiple stakeholders to form cross-departmental communication and cooperation (Bridgstock et al., 2010; Spear et al., 2009). Because of resource constraints, social enterprises need to acquire resources from different stakeholders, including the government, charity funding, volunteers, customers, and so forth (Doherty et al., 2014; Wang et al., 2015). Considering that a social enterprise is an emerging form of hybrid organization that lacks the mature organizational structure recognized by stakeholders, it is relatively difficult for social enterprises to gain legitimacy compared to other types of organizations (Yang & Wu, 2016).

Based on case studies and theoretical analysis, previous work has discussed the effects of social networks and legitimacy on the success of social enterprises (Jenner, 2016) and how social enterprises interact with stakeholders to gain legitimacy (Yang & Wu, 2016). However, there is little empirical research on the outcomes and antecedents of social enterprises' organizational legitimacy. Only Wang and Zhou (2020) investigated the mediating role of organizational legitimacy between business model innovation and social enterprise performance using data from 183 new social enterprises. This study will explore how social entrepreneurial passion and entrepreneurial competence improve social enterprise performance by enhancing organizational legitimacy and the boundary conditions of this process.

2.4 | Social entrepreneurial passion, entrepreneurial competence, and organizational legitimacy

Research on institutional logics suggests that the characteristics of social entrepreneurs influence the way they select and draw on institutional logics, which in turn affects the legitimacy they obtain from stakeholders (Besharov & Smith, 2014; Thornton & Ocasio, 2008). Different

entrepreneurs interpret and employ institutional logics in different ways. The institutional logic they take determines their allocation of attention to which problems should be prioritized and which solutions can be chosen (Thornton & Ocasio, 2008). For the stakeholders of the organizations, distinct institutional logics help them judge the organizations' appropriateness and legitimacy, in turn deciding the extent to which they provide resource support for the organizations (Vickers et al., 2017). Given that social enterprises pursue both social and economic value, we propose that social entrepreneurial passion and entrepreneurial competence promote organizational legitimacy according to the logics of commercial and social welfare.

Entrepreneurial passion is a positive emotion and salient self-identification for entrepreneurs' own work (Cardon et al., 2013). It has been proven to be positively related to venture survival and growth (Stenholm & Renko, 2016). With high passion, entrepreneurs will search for new opportunities and resources and persist even in situations of low legitimacy and limited resources (Cardon et al., 2013). Entrepreneurial passion is always accompanied by obvious cognitive and behavioral manifestations, including facial expressions, body language, and communication content (Chen et al., 2009). Thus, entrepreneurial passion can help entrepreneurs harvest trust and recognition from stakeholders (i.e., employees, customers, cooperators, and investors) for themselves and their organization (Davis et al., 2017; Ho & Pollack, 2014).

Social entrepreneurial passion refers to the positive emotion and identification of social entrepreneurs toward activities related to social entrepreneurship, which can motivate entrepreneurs to actively seek solutions to social problems (Ko et al., 2019; Thorgren & Omoredé, 2018). Social entrepreneurship can be regarded as the process by which social entrepreneurs identify and exploit opportunities to create social value through commercial activities and the combination of diversified resources (Dacin et al., 2010). Social entrepreneurs raise funds and attract stakeholders' support by developing new products, services, processes, or novel ways of combining existing resources (Doherty et al., 2014; Liu et al., 2015). Obtaining organizational legitimacy and collecting diverse resources through image and relationship building are vital for social enterprises to break resource constraints (Doherty et al., 2014; Thorgren & Omoredé, 2018).

In this study, we suggest that social entrepreneurial passion improves organizational legitimacy by embracing both commercial and social welfare logics. First, social enterprises can obtain the endorsement of commercial stakeholders (e.g., clients, suppliers, investors, and industrial partners) by responding to institutional demands derived from commercial logic. With high passion, social entrepreneurs exert considerable efforts in developing their enterprise and recognizing and grasping new patterns of pursuing opportunities to enhance economic values and achieve financial sustainability (Cardon et al., 2013). Passionate entrepreneurs will try to develop innovative products or services and improve the organization's operations, eventually achieving the long-term development of the organization (Ko et al., 2019). These active actions transmit legitimacy signals to stakeholders and obtain their goodwill and support (Pollack et al., 2012). Social entrepreneurial passion also motivates entrepreneurs to actively interact with stakeholders, such as customers, investors, or cooperators, acquiring trust and help from others through emotional contagion and persuasion (Chen et al., 2009). It benefits from establishing good relationships with commercial stakeholders, expanding formal and informal networks, and obtaining more resource support from stakeholders, which enhances the organizational legitimacy of the social enterprise (Dacin et al., 2007; Ho & Pollack, 2014).

Second, social enterprises must consider the institutional demands of donors, local governments, volunteers, communities, and other stakeholders embedded in the system of social welfare logics. Passionate social entrepreneurs have an acute awareness of problems in society, and they can recognize opportunities from neglected social problems (Cardon et al., 2013). In

addition, passionate social entrepreneurs often develop creative solutions to social problems and find innovative ways of resource bricolage and resource mobilization to design solutions (Ko et al., 2019; Stenholm & Renko, 2016). Thus, social enterprises can transfer positive signals of their social mission and strategic intention to the stakeholders related to public welfare and build their reputation in society (Pollack et al., 2012). Stakeholders such as donors, governments, charity funding, and volunteers are inclined to have a high evaluation and recognition of the organization and are more willing to support the organization (Thorgren & Omoredé, 2018). Hence, the social enterprise gains more organizational legitimacy. Therefore, we hypothesize the following:

Hypothesis 1. Social entrepreneurial passion is positively related to organizational legitimacy.

Entrepreneurial competence is the individual characteristic of entrepreneurs to engage in entrepreneurial activities successfully and continuously, which includes the attitude, beliefs, knowledge, skills, and abilities related to entrepreneurship (Ahmad et al., 2010; Mitchelmore & Rowley, 2010). Past research has highlighted that entrepreneurial core processes are enabled by specific competencies (Lans et al., 2011). In the context of social enterprises, entrepreneurial competence involves the abilities and skills to identify profitable social enterprise opportunities, including the opportunity of raising funding, business operations, or social problem-solving (Smith et al., 2012).

We propose that entrepreneurial competence enhances organizational legitimacy by employing commercial and social welfare logics. First, from the commercial logic perspective, the entrepreneurial competence of social entrepreneurs can help social enterprises project a professional image and win the approval of members in their commercial networks. Research has shown that entrepreneurial competence is positively related to the establishment, survival, and growth of new ventures (Colombo & Grilli, 2005; Schmitt-Rodermund, 2004). With high levels of entrepreneurial competence, social entrepreneurs can promptly identify and make use of market opportunities in the environment (Chandler & Hanks, 1994). Such entrepreneurs constantly scan the environment and utilize emerging opportunities to promote social enterprise growth (Muzychenko, 2008). They not only have keen insight into the needs of customers, cooperators, and investors, but also have the ability to plan and manage projects to meet those needs (Orhei et al., 2015). The entrepreneurial competence of social entrepreneurs enables them to provide valuable products or services to customers and create a realistic picture for investors and cooperators of how social enterprises operate successfully. Therefore, social enterprises are able to draw much attention and approval from commercial stakeholders, which facilitates the enhancement of their organizational legitimacy.

Second, from the social welfare logic perspective, social entrepreneurs' entrepreneurial competence is conducive to convincing stakeholders in the public social sector. Prior literature has proposed that entrepreneurial competence affects donation decisions (Donaldson et al., 2021; Smith et al., 2012). Social entrepreneurs with high entrepreneurial competence have relevant knowledge, skills, and abilities to solve societal problems and manage their relationships with nonprofit partners (Smith et al., 2012). For instance, the high entrepreneurial competence of social entrepreneurs helps social enterprises establish reasonable systems to manage volunteers, produce novel and meaningful ideas related to solving social problems, and meet the standards of government and third-party evaluation agencies. Thus, entrepreneurial competence helps social entrepreneurs serve their stakeholders effectively, obtain high recognition from stakeholders in the social sector, and

ultimately improve organizational legitimacy (Bacq & Eddleston, 2018; Lans et al., 2011). Therefore, we hypothesize the following:

Hypothesis 2. Entrepreneurial competence is positively related to organizational legitimacy.

2.5 | Organizational legitimacy and social enterprise performance

Social enterprises are usually smaller and less profitable than commercial enterprises (Dart, 2004; Doherty et al., 2014). Organizational legitimacy is crucial to the survival and growth of social enterprises (Yang & Wu, 2016). Social enterprises with high legitimacy have easier access to resources and can acquire high-quality resources at a lower cost (Certo & Hodge, 2007). They are likely to be supported by different stakeholders, such as local governments, volunteers, charity funding, and customers. For example, government support can affect the scale of social enterprises' social impact (Bacq & Eddleston, 2018). The government can provide social enterprises with the support of funding and preferential policies. Charity funding and social venture capital can also provide financial resources for social enterprises (Doherty et al., 2014). On the one hand, based on the resource support generated by legitimacy, social enterprises can invest more resources in R&D programs and develop new products or services to increase sales and improve financial status, ultimately enhancing economic performance (Liu et al., 2015; Yang & Wu, 2016). On the other hand, social enterprises can obtain more support for social service projects, improve their social service quality, expand their service scope and benefit groups, and realize a higher social value (Bacq & Eddleston, 2018). Therefore, we hypothesize the following:

Hypothesis 3. Organizational legitimacy is positively related to social enterprises' (a) social performance and (b) economic performance.

2.6 | Mediating role of organizational legitimacy

As the research on institutional logics illustrates, entrepreneurs' characteristics can influence the legitimacy they acquire from stakeholders, producing effects on firm performance (Miller et al., 2011; Thornton & Ocasio, 2008). The legitimacy literature also suggests that organizational legitimacy is an underlying mechanism that explains how executives' characteristics affect organizational performance. For example, Certo and Hodge (2007) found that top management team prestige will influence the judgment of investors on firms' future financial performance through the mediating role of organizational legitimacy. Wang et al. (2017) indicated that firms with sustainable leadership can gain more external legitimacy, which in turn improves their financial and social performance. Accordingly, we conclude that organizational legitimacy may be the bridge that links leader characteristics and firm performance.

Specifically, as the two core characteristics of social entrepreneurs, social entrepreneurial passion and entrepreneurial competence can help social enterprises build relationships with stakeholders and promote stakeholders' recognition of social enterprises, thereby increasing organizational legitimacy (Donaldson et al., 2021; Ho & Pollack, 2014; Ko et al., 2019). As organizational legitimacy can help social enterprises acquire a wide range of resources from

stakeholders, social enterprises with high organizational legitimacy can improve their financial income and serve more people, ultimately realizing both economic and social value (Bacq & Eddleston, 2018; Wang & Zhou, 2020; Yang & Wu, 2016). Therefore, we have the following hypotheses:

Hypothesis 4. Organizational legitimacy mediates the relationship between social entrepreneurial passion and social enterprises' (a) social performance and (b) economic performance.

Hypothesis 5. Organizational legitimacy mediates the relationship between (a) entrepreneurial competence and social enterprises' (a) social performance and (b) economic performance.

2.7 | Moderating role of regulatory uncertainty

Institutional theory has indicated that the structure of institutional fields powerfully influences organizations' operations (Meyer & Rowan, 1977). Organizational factors interact with institutional fields' characteristics to generate variation in organizational outcomes (Besharov & Smith, 2014). Regulatory uncertainty refers to the "extent to which governmental regulations and policies change frequently and unpredictably" (Wang et al., 2016, p. 86). Unlike social enterprises in developed countries with well-established institutional infrastructure, social enterprises in China confront pluralistic and conflicting institutions (Jayanti & Raghunath, 2018). There are significant differences in the level of institutionalization among industries and regions in China, which results in variation in social enterprises' perception of regulatory uncertainty.

When confronted with frequent changes in external environments, firms usually choose to strengthen their cooperation with partners and increase the frequency of communications with different stakeholders to acquire information and resources and lift organizational efficiency (Qian et al., 2016). Previous evidence has suggested that when regulatory uncertainty is high rather than low, the trust between stakeholders will benefit more from the effectiveness of cooperation (Wang et al., 2016). When regulations and policies change quickly, social enterprises will experience high uncertainty in business operations and social services, which increases operational risks (Dutt & Joseph, 2019). Hence, to eliminate risk and uncertainty, social enterprises are likely to rely heavily on their cooperation with the government, large corporations, charity funding, or other stakeholders, which makes organizational legitimacy more critical for supporting social and economic activities (Sheng et al., 2011). Social enterprises will increase the efficiency of resource acquisition and utilization through organizational legitimacy to cope with high regulatory uncertainty (Desa, 2012). They will try to obtain more high-quality information and resources from stakeholders and fully benefit from acquired resources (Sheng et al., 2011), which ultimately augments the effect of organizational legitimacy on social and economic performance. Therefore, we hypothesize the following:

Hypothesis 6. Regulatory uncertainty positively moderates the relationship between organizational legitimacy and social enterprises' (a) social performance and (b) economic performance.

Figure 1 shows the proposed hypotheses and the theoretical model of this study.

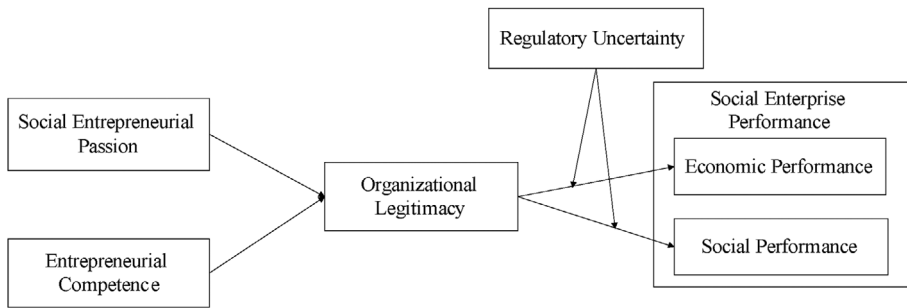


FIGURE 1 Theoretical model.

3 | METHODOLOGY

3.1 | Sample

The survey data collected for this study is from Chinese social enterprises, whose organizational mission is to solve social problems. Social enterprises have a short history in China; most were founded in the last 20 years. Although there exist some social enterprises transforming from long-established commonwealth organizations, the total number of social enterprises in China is small, which makes data collection difficult. To acquire social enterprise information, we attended some national conferences and forums related to social enterprises, such as the Global Social Entrepreneurs Forum and the China New Forces in Philanthropy Forum. These conferences and forums brought together founders of charitable foundations, leaders of public welfare organizations, top managers of social enterprises, and academic experts in the area of public welfare. From these activities, we obtained a list of social enterprises and their contact information. Next, by searching these social enterprises on the internet and browsing their official websites, we verified the information of the social enterprises on the list to ensure that the enterprises focused on their social mission and created economic value. After checking the information of these social enterprises, we contacted the heads of the enterprises and sent them an invitation to fill out the questionnaire.

After obtaining permission from these social enterprises, we distributed the questionnaires through the internet. We chose the head of each social enterprise as the key informant because they have a good understanding of the overall business of their enterprise. We distributed 210 questionnaires and finally obtained 198 valid questionnaires after eliminating incomplete questionnaires (response rate: 94.29%). The sample of social enterprises included a wide range of industries, such as education, environmental protection, health, nursing, old-age support, finance, community employment, and vulnerable-group support. The demographic data of these social enterprises are shown in Table 1.

3.2 | Measures

Social entrepreneurial passion, entrepreneurial competence, organizational legitimacy, social performance, economic performance, and regulatory uncertainty were measured on a five-point Likert scale (1–5). The items are seen in the Appendix A.

TABLE 1 Sample composition.

Variables	Type	Frequency	Percentage(%)
Registration type	Civil registration	81	40.9
	Industrial and commercial registration	86	43.4
	Unregistered (including civil filing)	31	15.7
Employee numbers	≤10	110	55.6
	11–50	44	22.2
	51–100	12	6.1
	>100	32	16.2
Enterprise age	<10 years	106	53.5
	10–20 years	62	31.3
	>20 years	30	15.2
Industry	Education	36	18.2
	Environmental protection	12	6.1
	Health/nursing/ old-age support	48	24.2
	Finance	5	2.5
	Vulnerable-group support	30	15.2
	Community employment	67	33.8
Entrepreneur gender	Male	99	50.0
	Female	99	50.0
Entrepreneur age	≤30 years old	35	17.7
	31–35 years old	52	26.3
	36–40 years old	46	23.2
	≥41 years old	65	32.8
Entrepreneur education	Middle school	3	1.5
	High school	12	6.1
	College	46	23.2
	Bachelor	112	56.6
	Master or PhD	25	12.6
Entrepreneur work tenure	<1 years	6	3.0
	1–2 years	25	12.6
	3–5 years	45	22.7
	6–10 years	56	28.3
	>10 years	66	33.3

3.2.1 | Social entrepreneurial passion

To assess the entrepreneurial passion of social entrepreneurs, we adopted the 13-item scale developed by Cardon et al. (2013) and revised their original items based on the attributes of social enterprises. Sample items include “Establishing a new social enterprise excites me” and “Pushing my employees and myself to make our organization better motivates me.”

3.2.2 | Entrepreneurial competence

We used the six-item scale developed by Chandler and Hanks (1994) to measure entrepreneurial competence, which includes items such as “One of my greatest strengths is my ability to seize high-quality business opportunities” and “I accurately perceive unmet consumer needs.”

3.2.3 | Organizational legitimacy

Based on the research of Certo and Hodge (2007) and Wei et al. (2017), we used a 9-item scale to measure how social enterprises are accepted by their environmental constituents. For example, items include “Customers highly value our products,” “Donators want to do business with us,” and “Volunteers identify highly with our organization.”

3.2.4 | Regulatory uncertainty

Following Wang et al. (2016), we adopted three items to measure the extent to which governmental regulations and policies change. Sample items are “The government regulations change frequently” and “The changes of government regulations greatly affect our business operation.”

3.2.5 | Economic performance and social performance

We used items developed by Liu et al. (2015) to measure social enterprise performance. The measurement of economic performance contains 11 items, such as “acquiring new enterprise customers” and “reaching enterprise financial goals.” Social performance was assessed with 10 items. Sample items are “Serves more beneficiaries in the community” and “Expand social service to different locations.”

3.2.6 | Control variables

In this study, we controlled the registration type of enterprises. Social enterprises include both commercial enterprises that contribute to solving social problems and nonprofit organizations that achieve revenue through business operations (Yin & Chen, 2018). We used two dummy variables: registration Type 1 represents enterprises in civil registration; registration Type 2 represents enterprises in industrial and commercial registration; and the baseline group refers to enterprises in the incubation stage that have not yet been registered. The registration type will lead to different forms and degrees of government intervention, which generates different impacts on the business model and public welfare model of social enterprises (Tian et al., 2018).

We also controlled for the number of full-time employees, enterprise age, and industry type. Industry type was controlled by five dummy variables: education, environmental protection, health/nursing/old-age support, community employment, and vulnerable-group support, with finance as the baseline group. On the individual level, we controlled for entrepreneur gender (0 = female, 1 = male), age (1 = below 25 years old; 2 = from 26 to 30 years old; 3 = from 31 to 35 years old; 4 = from 36 to 40 years old; 5 = more than 40 years old), and education level

(1 = middle school; 2 = high school; 3 = college; 4 = bachelor's degree; 5 = master's degree or PhD). We also controlled for entrepreneurs' tenure working for the social enterprise (1 = less than 1 year; 2 = from 1 to 2 years; 3 = from 3 to 5 years; 4 = from 6 to 10 years; 5 = more than 10 years).

4 | RESULTS

4.1 | Reliability and validity

Before testing the hypotheses, we assessed the reliability and validity of our study. As Table 2 shows, for each variable, the value of Cronbach's alpha is more than 0.7, which indicates that the measurement has high internal consistency and good reliability. The factor loadings of all items are higher than 0.5. The value of the average variance extracted (AVE) of each variable exceeds 0.7, and the composite reliability (CR) of each variable is higher than 0.7. Thus, the measurement in this study has adequate convergent validity. Table 3 presents the means, standard deviations, and correlations of all variables. In Table 3, the square root of the AVE of each variable is greater than the correlations between the variable and any other variable, which supports discriminant validity in this study (Koufteros, 1999).

Furthermore, we conducted a confirmatory factor analysis (CFA) using Mplus 7.0 to examine the reliability and validity of the overall measurement model. The item parceling method recommended by Bagozzi and Edwards (1998) is widely used in previous research (e.g., Aryee et al., 2015; Lam et al., 2018), which aims to balance the ratio of parameters to sample. Before conducting CFA, we employed the item parceling method and created three parcels for social entrepreneurial passion, organizational legitimacy, economic performance, and social performance. The results of CFA are presented in Table 4. The results suggest that the proposed measurement model ($\chi^2 = 402.76$, $df = 168$, $CFI = 0.93$, $TLI = 0.92$; $RMSEA = 0.08$) fits the data better than any alternative model. Therefore, the measurement model in this study has high discriminant validity.

4.2 | Common method variance

Considering that we collected data from a single source, common method variance may exist. To reduce the concern about common method variance, we applied two tests. First, we adopted

TABLE 2 Reliability and validity.

Variables	Factor loading	Cronbach's alpha	AVE	CR
Social entrepreneurial passion	0.59–0.89	0.95	0.58	0.95
Entrepreneurial competence	0.77–0.87	0.91	0.68	0.93
Organizational legitimacy	0.71–0.84	0.92	0.61	0.93
Regulatory uncertainty	0.79–0.86	0.75	0.67	0.86
Economic performance	0.58–0.85	0.91	0.54	0.93
Social performance	0.69–0.89	0.93	0.65	0.95

TABLE 3 Means, standard deviations, and correlations.

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	Enterprise age	1.62	0.74	-											
2	Employee number	3.19	2.13	0.48***	-										
3	Gender	0.50	0.50	-0.07	0.08	-									
4	Age	3.71	1.11	0.08	-0.08	-0.05	-								
5	Education	3.73	0.82	0.05	0.12	-0.01	-0.35***	-							
6	Work tenure	3.76	1.14	0.25***	0.11	-0.12	0.33***	-0.09	-						
7	Social entrepreneurial passion	4.12	0.54	-0.06	-0.05	-0.05	-0.03	-0.02	-0.06	(0.76)					
8	Entrepreneurial competence	3.89	0.60	-0.02	0.08	0.01	-0.02	0.03	0.04	0.67***	(0.83)				
9	Organizational legitimacy	3.91	0.61	0.13	0.19**	-0.05	0.03	-0.13	0.14*	0.57***	0.60***	(0.78)			
10	Regulatory uncertainty	3.61	0.71	0.01	0.01	0.01	0.07	-0.10	0.09	0.33***	0.38***	0.27***	(0.82)		
11	Economic performance	3.80	0.61	0.07	0.15*	-0.07	-0.03	0.00	0.20**	0.44***	0.54***	0.66***	0.28***	(0.74)	
12	Social performance	3.68	0.75	0.05	-0.03	-0.13	0.03	-0.20**	0.07	0.43***	0.42***	0.61***	0.29***	0.56***	(0.80)

Note: $n = 198$. The values of the square root of AVE are on the diagonal.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

TABLE 4 Confirmatory factor analysis.

Model	Description	χ^2	Df	$\Delta\chi^2$	CFI	TLI	RMSEA
Measurement model	Six-factor model	402.76	168		0.93	0.92	0.08
Model 1	Five-factor model	635.38	173	232.62***	0.87	0.84	0.12
Model 2	Four-factor model	840.01	177	437.25***	0.82	0.78	0.14
Model 3	Three-factor model	949.5	180	546.74***	0.79	0.75	0.15
Model 4	Two-factor model	1086.4	182	683.64***	0.75	0.71	0.16
Model 5	One-factor model	1146.94	183	744.18***	0.73	0.69	0.16

Note: $n = 198$. Model 1: social entrepreneurial passion and social performance were merged. Model 2: Social entrepreneurial passion, entrepreneurial competence, and social performance were merged. Model 3: Social entrepreneurial passion, entrepreneurial competence, regulatory uncertainty, and social performance were merged. Model 4: Social entrepreneurial passion, organizational legitimacy, and social performance were merged; entrepreneurial competence, economic performance, and regulatory uncertainty were merged. Model 5: All items were merged.

Abbreviations: CFI, comparative fit index; RMSEA, root mean-square error of approximation; TLI, tucker-lewis index.

*** $p < 0.001$.

Harman's single-factor test (Podsakoff & Organ, 1986). The results suggest that all items together account for 78.41% of the total variance, with the first factor explaining only 14.81% of the total variance. Then, following Kammerlander et al. (2015), we compare the CFA results between the one-factor model and the hypothesized measurement model. The results of Table 4 indicate that the model fit of the one-factor model with only one dominant factor ($\chi^2 = 1146.94$, $df = 183$, $CFI = 0.73$, $RMSEA = 0.16$) is significantly worse than the hypothesized measurement model ($\chi^2 = 402.76$, $df = 168$, $CFI = 0.93$, $RMSEA = 0.08$). Therefore, common method variance was not a serious problem in our study.

4.3 | Hypothesis testing

Using Mplus 7.0 software, we adopted the structural equation model (SEM) to conduct path analysis and examine the hypothesized relationships between constructs. Tables 5 and 6 present the results of path analysis, mediation, and moderation effects. First, the direct and indirect effects were examined without including the moderator. All the control variables were incorporated into the model. The hypothesized model (Model 1 in Table 5) showed a good fit to our data: $\chi^2 = 550.36$, $df = 314$, $CFI = 0.93$, $RMSEA = 0.06$.

Hypotheses 1 and 2 propose that social entrepreneurial passion and entrepreneurial competence should be positively related to organizational legitimacy. As the results of Model 1 in Table 5 suggest, both social entrepreneurial passion ($\beta = 0.35$, $p < 0.05$) and entrepreneurial competence ($\beta = 0.38$, $p < 0.01$) significantly affect organizational legitimacy. Thus, Hypotheses 1 and 2 were supported. Hypothesis 3 stated that organizational legitimacy is positively related to social enterprises' (a) social performance and (b) economic performance. The results of Model 1 indicated that organizational legitimacy significantly affects social performance ($\beta = 0.65$, $p < 0.001$) and financial performance ($\beta = 0.67$, $p < 0.001$), thus supporting Hypothesis 3.

To test the mediation effect in SEM, we used the bootstrapping method in Mplus with 5000 bootstrap samples (Hayes, 2009). The results are presented in Table 6. The indirect effect of social entrepreneurial passion on social performance via organizational legitimacy is

TABLE 5 Results of structural model analysis.

Description of path	Main effects (Model 1)		Interaction effects (Model 2)		Results
	Path coefficient	T-value	Path coefficient	T-value	
H1: Social entrepreneurial passion → organizational legitimacy	0.35*	2.36	0.35**	3.38	Supported
H2: Entrepreneurial competence → organizational legitimacy	0.38**	2.70	0.38***	3.70	Supported
H3a: Organizational legitimacy → social performance	0.65***	6.02	0.65***	8.08	Supported
H3b: Organizational legitimacy → economic performance	0.67***	5.60	0.67***	7.98	Supported
H6a: Organizational legitimacy × regulatory uncertainty → social performance			0.08	1.24	Not supported
H6b: Organizational legitimacy × regulatory uncertainty → economic performance			0.15*	2.23	Supported
Industry1 → social performance	0.02	0.13	0.01	0.10	
Industry2 → social performance	0.03	0.29	0.04	0.43	
Industry3 → social performance	0.00	0.02	−0.01	−0.05	
Industry4 → social performance	0.03	0.20	0.02	0.16	
Industry5 → social performance	0.05	0.29	0.05	0.34	
Registration type1 → social performance	0.02	0.23	0.02	0.22	
Registration type2 → social performance	−0.20*	−2.18	−0.22**	−2.77	
Enterprise age → social performance	0.05	0.70	0.05	0.78	
Employee number → social performance	−0.17*	−2.58	−0.17**	−2.90	
Gender → social performance	0.10*	1.98	0.11*	2.20	
Age → social performance	−0.07	−1.11	−0.07	−1.26	
Education → social performance	−0.03	−0.48	−0.02	−0.28	
Work tenure → social performance	0.01	0.16	0.00	0.03	
Regulatory uncertainty → social performance			0.07	0.99	
Industry1 → economic performance	0.24	0.87	0.22	1.62	
Industry2 → economic performance	0.21	1.15	0.21*	2.26	
Industry3 → economic performance	0.30	0.97	0.28	1.86	
Industry4 → economic performance	0.24	0.88	0.22	1.64	
Industry5 → economic performance	0.37	1.10	0.37*	2.27	

TABLE 5 (Continued)

Description of path	Main effects (Model 1)		Interaction effects (Model 2)		Results
	Path coefficient	T-value	Path coefficient	T-value	
Registration type1 → economic performance	−0.02	−0.24	−0.02	−0.31	
Registration type2 → economic performance	0.18	1.80	0.15	1.73	
Enterprise age → economic performance	−0.03	−0.54	−0.04	−0.60	
Employee number → economic performance	−0.03	−0.44	−0.03	−0.41	
Gender → economic performance	0.06	1.07	0.06	1.21	
Age → economic performance	−0.01	−0.11	−0.01	−0.11	
Education → economic performance	−0.02	−0.31	0.00	0.01	
Work tenure → economic performance	0.04	0.56	0.03	0.45	
Regulatory uncertainty → economic performance			0.01	0.14	

Note: $N = 198$, all path coefficients are standardized estimates.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

TABLE 6 Bootstrapping results of indirect effects (95% confidence interval).

Path	Indirect effects	Standard error	LLCI	ULCI	Results
H4a: Social entrepreneurial passion → organizational legitimacy → social performance	0.23	0.11	0.05	0.50	Supported
H4b: Social entrepreneurial passion → organizational legitimacy → economic performance	0.24	0.11	0.05	0.52	Supported
H5a: Entrepreneurial competence → organizational legitimacy → social performance	0.24	0.10	0.06	0.44	Supported
H5b: Entrepreneurial competence → organizational legitimacy → economic performance	0.25	0.11	0.05	0.47	Supported

significantly positive ($\beta = 0.23$, 95% CI [0.05, 0.50], excluding 0). The indirect effect of entrepreneurial competence on social performance via organizational legitimacy is significantly positive ($\beta = 0.24$, 95% CI [0.06, 0.44], excluding 0). The indirect effect of social entrepreneurial passion on economic performance via organizational legitimacy is significantly positive ($\beta = 0.24$, 95% CI [0.05, 0.52], excluding 0). The indirect effect of entrepreneurial competence on economic performance via organizational legitimacy is significantly positive ($\beta = 0.25$, 95% CI [0.05, 0.47], excluding 0). Therefore, Hypotheses 4a, 4b, 5a, and 5b were supported.

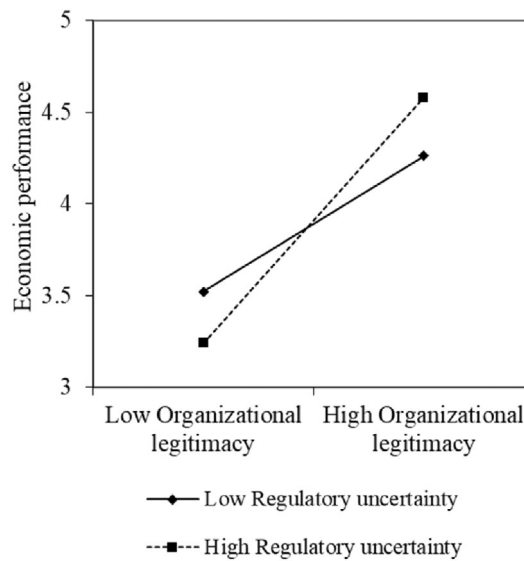


FIGURE 2 The moderating effect of regulatory uncertainty.

For the moderation effects, we adopted the matched-pair strategy recommended by Marsh et al. (2004) to create product indicators of the latent interaction factor. We combined multiple indicators of organizational legitimacy and regulatory uncertainty in pairs to construct the latent interaction term. Compared to Model 1, we added the direct effect and moderating effects of regulatory uncertainty in Model 2 (Table 5). The fit indices of the proposed moderation model (Model 2) were good, with $\chi^2 = 843.41$, $df = 500$, $CFI = 0.91$, $RMSEA = 0.06$. As the results of Model 2 in Table 5 demonstrated, Hypothesis 6a, predicting a positive moderating effect of regulatory uncertainty on the relationship between organizational legitimacy and social performance, was not supported ($\beta = 0.08$, n.s). Hypothesis 6b proposes that regulatory uncertainty positively moderates the effect of organizational legitimacy on economic performance. The results of Model 2 in Table 5 revealed that the interaction between organizational legitimacy and regulatory uncertainty is positively related to economic performance ($\beta = 0.15$, $p < 0.05$). Therefore, Hypothesis 6b was supported.

To further explore the moderating effect, we plotted the graph of the relationship between organizational legitimacy and economic performance when the moderator is at low and high levels. We set the low level of the moderator as one standard deviation below the mean score of regulatory uncertainty and set the high level as one standard deviation over the mean score. Consistent with our arguments, Figure 2 depicts that when regulatory uncertainty is high rather than low, the relationship between organizational legitimacy and economic performance is stronger.

5 | DISCUSSION

Social enterprises aim to meet social objectives through economic value creation (Liu et al., 2015), which has attracted extensive attention from society. Using data from 198 social enterprises in China, this study found that social entrepreneurial passion and entrepreneurial

competence influence social enterprise performance by enhancing organizational legitimacy, and regulatory uncertainty moderates the relationship between organizational legitimacy and social enterprises' economic performance.

5.1 | Theoretical implications

This study provides several theoretical implications. First, this study extends research on institutional logics. Most research on institutional logics has focused on how institutional logics shape different organizational outcomes (Besharov & Smith, 2014; Thornton & Ocasio, 2008). However, a few empirical studies adopt the institutional logic approach to explain how individuals or organizations obtain legitimacy (e.g., Basco, 2019; Pache & Chowdhury, 2012). As Thornton and Ocasio (2008) appealed, there is a need for more work on the microfoundations of institutional logics. Pache and Santos (2013) also indicated that there is a lack of explanation of how logics are achieved inside organizations and what factors drive actors in social enterprises to select and enact elements of logics when dealing with multiple demands. Responding to these calls, our research finds that social entrepreneurs with passion and competence on the micro level utilize the institutional logics of commercial and social welfare to make their organizations consistent with the macro, prevailing institutions and gain organizational legitimacy. In addition, this study confirms that social entrepreneurial passion and entrepreneurial competence enable social enterprises to combine two seemingly unrelated logics and connect with multiple social actors in complex environments, which provides evidence for the literature that emphasizes the combination of commercial and social welfare logics in social enterprises (Im & Sun, 2015; Pache & Santos, 2013).

Second, this study contributes to understanding how social entrepreneur characteristics promote enterprise performance. Scholars have called for shedding light on the role of social entrepreneurs in social enterprise growth and investigating the underlying mechanisms in such relationships (Kimakwa et al., 2021; Stephan & Drencheva, 2017). This study found that social entrepreneurial passion and entrepreneurial competence, two key characteristics of social entrepreneurs, allow entrepreneurs to transmit legitimacy signals to stakeholders, gain the recognition and support of stakeholders, and enhance organizational legitimacy (Feng & Wang, 2010; Tornikoski & Newbert, 2007). Accordingly, social enterprises can acquire diverse resources and promote social and economic performance (Wang & Zhou, 2020). The findings of this study enrich the research on the antecedents of social enterprise performance and provide new insights into the intervening mechanism through which social entrepreneur characteristics effectively influence enterprise performance.

Third, this study adds to the research on the facilitators and outcomes of organizational legitimacy in social enterprises. In the pursuit of social and economic value, social enterprises are confronted with conflicting expectations from multiple stakeholders, which poses difficulties for achieving organizational legitimacy (Doherty et al., 2014; Yang & Wu, 2016). Entrepreneurs are important sources for organizations to transmit legitimacy signals to the external environment (Feng & Wang, 2010; Tornikoski & Newbert, 2007). Scholars have proposed that social entrepreneurs need to develop a wide network and the ability to leverage external resources (Ko et al., 2019). Similar to these statements, this study found that social entrepreneurial passion and entrepreneurial competence help social entrepreneurs establish good relationships with stakeholders and meet the needs of stakeholders, which facilitates the development of social networks and the enhancement of organizational legitimacy (Lans

et al., 2011; Thorgren & Omorede, 2018). Regarding the outcomes of legitimacy, prior research has theoretically suggested that organizational legitimacy leads to the competitive advantages and success of social enterprises (Doherty et al., 2014; Jenner, 2016). Consistent with these views, this study proves that organizational legitimacy helps social enterprises gain resource support from multiple sources and significantly improves social enterprises' social and economic performance.

Furthermore, this study contributes to enriching the research on the boundary conditions under which organizational legitimacy is effectively transformed into performance by examining the moderating role of regulatory uncertainty. Prior studies have reached mixed conclusions on the role of regulatory uncertainty in enterprises' operations as a contingency. Some have proposed that regulatory uncertainty hinders organizations' obedience to regulation and reduces their expected value from stakeholders (Adomako & Tran, 2022; Lau et al., 2018). Conversely, other researchers have demonstrated that highly uncertain regulations will reinforce the effectiveness of trust between partners, information sharing, and knowledge transfer (Wang & Libaers, 2016). Consistent with the latter, the findings of our study indicated that regulatory uncertainty significantly strengthens the effect of organizational legitimacy on economic performance. We suggest that when regulations and policies change frequently, social enterprises tend to strengthen their cooperation with stakeholders and improve efficiency to resist risks, and organizational legitimacy plays a stronger role in improving economic performance. Therefore, this study provides support for the positive effect of regulatory uncertainty on the process by which social enterprises utilize legitimacy to obtain resources and achieve financial sustainability.

However, the results suggested that the moderating effect of regulatory uncertainty on the relationship between organizational legitimacy and social performance is nonsignificant. Previous research related to the role of regulatory uncertainty in organizational operations has focused on commercial enterprises and their financial performance (Adomako & Tran, 2022; Wang & Libaers, 2016). Different from commercial enterprises, there is a lack of a credible legislative framework for Chinese social enterprises (Bhatt et al., 2019; Yin & Chen, 2018). They are faced with fragmented and uneven regulations from multiple government departments and industrial associations in aspects of commercial operations and social welfare activities. For example, the Civil Affairs Bureau pays attention to the information disclosure of social enterprises, and the Market Regulation Bureau supervises their business operations. When facing the supervision of economic activities and performance, social enterprises with high legitimacy can make flexible adjustments in commercial operations, so legitimacy has a stronger effect on economic performance. However, regulations on the social welfare activities of social enterprises are usually one-size-fits-all. The criteria could be whether the social purpose of social enterprises can be recognized by the public or whether the business activities of social enterprises ultimately serve the social purpose. The lack of detailed and extensible rules will inhibit the flexibility of social enterprises in social welfare activities. Therefore, the effect of legitimacy on social performance is relatively fixed and does not change with changes in policy uncertainty. The results provide implications for future research that should distinguish between different types of regulations, such as social supervision and economic supervision of social enterprises.

Finally, our research focused on the context of China and extended the research on social enterprises in emerging economies. Numerous studies have previously investigated the operations of social enterprises in European and American countries with well-developed institutions (Defourny & Nyssens, 2010; Liu et al., 2015). Research has increasingly begun to explore how

social enterprises struggle against the dilemmas in emerging economies such as India and China (Agarwal et al., 2020; Tandon & Nair, 2020). As an emerging economy, China has immature institutional infrastructures and strong economic vitality, which results in pluralistic and conflicting institutions. Social enterprises in China are confronted with insufficient institutional support, competing external demands, resource constraints, and evolving regulations (Xing et al., 2020; Yin & Chen, 2018). Scholars have suggested that legitimacy is scarce in emerging economies with less-developed institutions and that building legitimacy for hybrid organizations is particularly important (Jayanti & Raghunath, 2018). Addressing this issue, our study proposed that social entrepreneurs' passion and competence help social enterprises eliminate institutional constraints and resource dilemmas, obtain legitimacy, and ultimately promote social and economic value. Given the similarities with other developing countries in economic and institutional conditions, the patterns and conclusions can provide some theoretical implications for other emerging markets.

5.2 | Managerial implications

This study also has managerial implications for social enterprises and the government. First, social entrepreneurs are the main source of social enterprise value creation. They drive social change and act as role models for the next generation. Social entrepreneurs have to express social entrepreneurial passion and foster entrepreneurial competence to achieve social enterprises' social mission and financial sustainability. Due to the lack of legal identity and weak institutional support in emerging markets, social entrepreneurs are often greeted with skepticism from society. Displaying passion and remarkable competence can help social entrepreneurs draw attention from a wide set of stakeholders and mitigate the skepticism they receive. Thus, social entrepreneurs should maintain an optimistic mood and adjust their mental state in a timely manner. They also have to pay attention to the cultivation of their competence, increase their alertness to the environment, and recognize various opportunities to develop their enterprises.

Second, in emerging economies such as China, where social enterprise is still a novel concept, there is no specific legislation or unified certification standards for social enterprises (Yin & Chen, 2018). Social enterprises must publicize their mission, establish social networks, strengthen cooperation with various stakeholders, and enhance organizational legitimacy. For example, social enterprises can participate in community activities, publicize themselves through various social media, and utilize narratives and stories to establish a good image. Social enterprises should also focus on partnership management with different stakeholders and improve the legitimacy evaluation of various groups, such as the government, investors, employees, volunteers, customers, and beneficiaries.

Third, to determine the effectiveness of organizational legitimacy in promoting performance, social entrepreneurs should take the institutional environment into account. As our findings illustrated, in environments with high regulatory uncertainty, social enterprises should place greater emphasis on cooperation with their stakeholders and resources obtained through legitimacy to counter the risks and costs produced by uncertain regulations. For example, social enterprises can utilize subsidies from governments and funds from philanthropic foundations to develop more high-quality products or services and build competitive advantages in their core businesses. They can also use cooperation with communities and social media platforms to scale their social impact.

Last, the results of this study suggest that organizational legitimacy is crucial to improving social enterprise performance. Given the scarcity of legitimacy of social enterprises in emerging markets (Jayanti & Raghunath, 2018), the governments of emerging economies need to exert more effort in building legitimacy and providing support for social enterprises. For instance, governments should improve the legal system and determine the legal status of social enterprises, formulate supportive policies to promote social enterprise development, increase subsidies and tax incentives, and standardize the supervision system. The government should ensure that the development of social enterprises does not deviate from their social goals while giving social enterprises enough autonomy to develop strategies in line with market conditions to achieve their financial goals.

5.3 | Limitations and future research

This study has some limitations that need to be addressed in future research. First, this study used cross-sectional data, which limits our ability to check causal relationships. Future research could adopt longitudinal and multiple data to examine the effects of social entrepreneur characteristics on social enterprise performance, for example, by collecting time-lagged objective performance to represent social enterprises' social and economic performance. Second, based on the perspective of institutional logics, this study highlighted the mediating role of organizational legitimacy and focused on the external support obtained by social enterprises. Future studies could explore the intermediate mechanism of internal processes in the relationship between social entrepreneur characteristics and enterprise performance. Third, although perceptual data on regulatory uncertainty has been widely used in previous studies (e.g., Wang et al., 2016; Wang & Libaers, 2016), the perception of changes in regulations may be biased by individual cognition. Future researchers could adopt objective indicators to represent regulatory uncertainty, such as the number of new policies related to social enterprises in a given year. Finally, this study was conducted in China. In the future, researchers may consider collecting data from different countries and making cross-cultural comparisons between emerging economies and developed countries. More objective indicators of regional and national environments could be taken into account as situational factors, such as economic levels, political status, and environmental munificence.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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APPENDIX A

Measurement Items

Social entrepreneurial passion (Cardon et al., 2013)

1. It is exciting to figure out new ways to solve unmet social needs that can be commercialized.
2. Searching for new ideas for products/services to offer is enjoyable to me.
3. I am motivated to figure out how to make existing products/services better.
4. Scanning the environment for new opportunities really excites me.
5. Inventing new solutions to problems is an important part of who I am.
6. Establishing a new social enterprise excites me.
7. Owning my own social enterprise energizes me.
8. Nurturing a new social enterprise through its emerging success is enjoyable.
9. Being the founder of a social enterprise is an important part of who I am.
10. I really like finding the right people to market my product/service to.
11. Assembling the right people to work for my social enterprise is exciting.
12. Pushing my employees and myself to make our organization better motivates me.
13. Nurturing and growing social enterprises is an important part of who I am.

Entrepreneurial competence (Chandler & Hanks, 1994)

1. I accurately perceive unmet consumer needs.
2. I spend considerable time and energy looking for products or services that will provide real benefits for my customers.
3. One of my greatest strengths is identifying goods and services people want.
4. One of my greatest strengths is my ability to seize high-quality business opportunities.
5. I have an extremely strong internal drive to see this venture through to fruition.
6. One of my greatest strengths is my ability to develop goods and services that are technically superior.

Organizational legitimacy (Certo & Hodge, 2007; Wei et al., 2017)

1. Customers highly value our products.
2. Donators want to do business with us.
3. Employees are proud to tell others they work at our organization.
4. Competitors view our organization with respect.
5. Volunteers identify highly with our organization.
6. Our organization has received high-profile endorsements from the government.
7. Our organization has received high evaluations from the government.
8. The government has introduced our organization to other entities as an example.
9. Government officials have visited our organization frequently.

Regulatory uncertainty (Wang et al., 2016)

1. The government regulations change frequently.
2. The changes of government regulations greatly affect our business operation.
3. Relevant local authorities such as Bureau of Tax and Bureau of Industry and Commerce Administration have great influence on our business operation.

(Continues)

Measurement Items

Social enterprise economic performance (Liu et al., 2015)

1. Achieving business unit profitability.
2. Reaching enterprise financial goals.
3. Enterprise customer satisfaction.
4. Delivering value to your enterprise customer.
5. Expand enterprise activities to different locations.
6. Engage more enterprise activities (different types).
7. Market share growth relevant to competition.
8. Acquiring new enterprise customers.
9. Acquiring new business sponsor/donation/support.
10. Increasing sales from enterprise customers.
11. Increasing the amount of business support from current business partners.

Social enterprise social performance (Liu et al., 2015)

1. Bidding for a public service contract.
2. Bidding government (or its funding body's) grants for enterprise activities.
3. Serves more beneficiaries in the community.
4. Provide more social service (different types).
5. Expand social service to different locations.
6. Acquiring new donors.
7. Acquiring new volunteers.
8. Increasing donation amount from current donor.
9. Increasing volunteer hours from current volunteers.
10. Growth in overall donation/volunteer time.

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从创造力到绩效： 领导－成员交换与员工情绪智力的作用

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摘要：员工创造力对其工作绩效的作用效果尚存争议，为解释其作用过程中的复杂性，基于社会交换理论与社会自我保存理论，提出一个整合领导－成员交换（LMX）中介作用与员工情绪智力调节作用的竞争性假设模型，探讨员工创造力对其工作绩效的影响机制。基于 293 对领导－下属双时点配对数据的分析表明：员工创造力正向影响 LMX；LMX 在创造力与工作绩效间起部分中介作用；情绪智力不仅正向调节创造力与 LMX 的关系，还增强创造力通过 LMX 影响工作绩效的间接效应。研究结果为解释创造力效能转化的复杂性提供系统解释，并为组织优化创造性员工的绩效管理策略提供实践依据。

关键词：员工创造力；工作绩效；领导－成员交换；情绪智力

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From Creativity to Performance: The Dual Roles of Leader-Member Exchange and Employee Emotional Intelligence

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Abstract: The effect of employee creativity on job performance remains debated. To explain the complexity of this relationship, drawing on social exchange theory and social self-preservation theory, this study proposes a competing hypotheses model integrating the mediating role of leader-member exchange (LMX) and the moderating effect of employee emotional intelligence to unravel the mechanism linking employee creativity to job performance. Based on the analysis on the two-wave matched data from 293 leader-follower dyads, the findings reveal that: (a) employee creativity positively predicted LMX quality; (b) LMX partially mediated the creativity-performance relationship; (c) EI not only strengthened the direct association between creativity and LMX but also amplified the indirect effect of creativity on performance via LMX. The results provide a systematic explanation of the complexity of creativity transformation and a practical basis for organizations to optimize performance management strategies for creative employees.

Key words: employee creativity; employee job performance; leader-member exchange; emotional intelligence

0 引言

在数字经济时代，技术迭代的加速与竞争格局的重塑，使员工创造力成为组织生存与发展的关键要素^[1]，其价值实现路径通常与工作绩效提升直接关联^[2]。然而，创造力向高绩效的转化可能受制于双重障碍：一方面，组织内部对员工创造力的隐性

排斥（如领导者对突破性方案存在认知偏差），导致资源分配向低风险路径倾斜；另一方面，员工的个体差异（如情绪能力等）阻碍创造性成果的效能转化^[3]。企业创造力培养的举措，常常未能达成预期绩效目标。这种“高创意－低产出”的效能困境，凸显了揭示创造力向绩效转化的中介机制与边界条

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件的理论紧迫性。

过往研究大多预设创造力有益于绩效，甚至将创造力视为绩效的构成要素，但却缺乏对这种潜在假设的严谨检验^[4]。近年来，创造力研究逐渐从“探索创造力前因”的传统范式转向解构“创造力后果”的作用机制。例如，美国管理学会分别于2014年与2019年两次设立专题论坛，系统探讨创造力的影响效果。在此背景下，员工创造力与工作绩效的关系逐渐引起实证研究的重视。但既有研究多聚焦于直接效应检验，且实证结论呈现显著分歧：部分研究基于制造业、保险公司等样本，证实员工创造力显著提升工作绩效；而针对美发师群体和酒店员工的研究则发现二者无显著关联。这种矛盾性揭示了直接效应模型的解释力局限：创造力未必总能直接促进工作绩效^[2]，中介机制缺失导致学界无法解释其潜在作用机制；创造力是否有利于绩效取决于特定条件^[5]，对边界条件的忽视使研究难以回答“何时”创造力能转化为绩效。

为厘清创造力向工作绩效转化的作用机制，本研究聚焦领导－成员交换（LMX）的中介作用。创造性想法可能因其不确定性及对现状的挑战而引发人际冲突与资源消耗等风险^[6]。员工需先获得直接领导的认可与支持，才能有效推进创新落地。领导掌控着信息、决策权及发展机会等关键资源^[7]，其对高创造力员工的支持程度直接影响创新成果向绩效的转化效率^[8]。根据LMX理论^[9]，当员工与领导建立高质量LMX关系时，一方面能够获得合法性背书，通过领导对创新方案的公开支持，降低组织内部阻力；另一方面能够获得领导的资源倾斜，推动创新方案落地。

然而，创造性员工能否与领导建立高质量LMX关系，仍存在理论争议。根据社会交换理论（social exchange theory）的核心互惠原则指出，当一方提供有价值资源时，另一方会产生回报的义务^[10]。因此，高创造力的员工通过新颖实用方案，帮助领导完成团队任务与组织目标^[11]，领导者基于互惠原则更倾向于提供资源支持，通过提高LMX质量促进创造力向绩效的转化。社会自我保存理论（social self-preservation theory）提供了反向解释。该理论认为，当个体感知到其社会地位或价值受到威胁时，会激活防御机制^[12]。针对创造力影响效果的最近综述指出，创意思想的实施存在不确定性，还可能引发不道德行为、人际冲突与资源消耗等负面后果^[6]。这些风险可能被领导者解读为对其权威或控制力的挑战，从而触发其防御反应，降低LMX质量并抑制绩效转化。这两种理论视角分别支持LMX在创造力与绩效

的关系中发挥正向中介效应与负向中介效应。由于现有研究未能明确这两种路径的主导条件，本研究提出竞争性假设检验，揭示LMX的中介作用方向。

竞争性假设的理论对立凸显揭示边界条件的必要性。社会交换理论强调个体特质对其互惠等核心机制具有重要调节作用^[10]，社会自我保存理论亦指出个体特质能够调节社会自我保存系统的激活强度^[12]。领导者对员工创造力的反应并非一成不变，而是显著地取决于员工特质的差异。员工创造力常常因使领导担忧权威受损引发抵触情绪而遭拒绝。员工情绪智力作为处理情绪的关键能力，即员工感知、理解和管理自己及他人情绪的能力^[13]，可能成为关键边界条件。情绪智力较高的员工能通过情绪识别与引导，降低领导者的防御性反应；同时通过凸显创新对组织目标的贡献，强化社会交换的互惠机制。实证研究表明，情绪智力能够显著帮助员工改善人际关系（包括LMX关系）^[14]。因此，本研究的第二个研究目的是检验员工情绪智力对创造力与LMX关系的调节效应，揭示情绪智力如何抑制社会自我保存路径、增强社会交换路径，以调和竞争性假设的理论冲突。

1 文献综述与研究假设

1.1 员工创造力与员工工作绩效

创造力指员工提出新颖且具实用性创新观点的能力^[15]。创造力研究的主流范式聚焦于探索该能力的培养路径，其理论预设在于创造力能优化问题解决流程，并拓展组织创新边界^[2]。然而，近年研究逐渐揭示创造力潜在的负向效应。例如，创造性活动固有的高风险性，可能引发同事嫉妒与排斥^[16]。这种内部张力与人际冲突往往触发管理者对自身权威地位的威胁感知。因而，在探索创造力的影响效果时，需综合分析其“双刃剑”效应。

工作绩效指员工完成与其岗位职责直接相关任务的程度^[17]。尽管理论层面反复强调创造力对绩效的积极影响^[8]，但实证研究结论却呈现显著分歧。Gong等^[2]、Martinaityte等^[8]、Oldham等^[18]、Wang^[19]以及Karaboga等^[20]等基于保险公司、制药企业、制造业和旅游酒店的样本数据，均证实员工创造力与工作绩效呈显著正相关。然而，Van Dyne等^[21]针对美发师群体的研究发现其创造力与工作绩效无显著关联，Sue-Chan等^[5]同样未能验证酒店员工创意新颖性与工作绩效之间的显著关系。

既有研究在员工创造力与工作绩效关系上呈现的实证分歧表明，创造力向绩效的转化过程可能受到尚未被充分揭示的中介机制与边界条件的制约，

这一观点得到了 Gong 等^[2]、Sue-Chan 等^[5] 以及 Zhang 等^[22] 等研究的支持。对于创造力-绩效的直接影响机制,学界大多强调创造力通过资源获取优势驱动绩效,即组织与领导者向高创造力员工倾斜支持性资源,助力创新性构想转化为卓越绩效^[6]。这一推论一方面揭示了学界探索创造力-绩效关系中介变量的研究趋势,例如将作为员工核心资源来源的 LMX 纳入理论框架进行检验;另一方面也暴露出当前研究的局限,即尚未充分考量创造力对绩效的潜在负面影响。此外,边界条件的调节作用亦是创造力对工作绩效影响效果存在分歧的重要原因。Gong 等^[2] 明确指出,创造力与工作绩效的关系可能因员工个体特质而异,这一论断为本研究提供了关键突破口。

基于既有研究启示,本研究构建以 LMX 为中介变量、员工情绪智力为调节变量的理论框架,以厘清员工创造力影响其工作绩效的作用机制。鉴于创造力可能呈现“双刃剑”效应,本研究依据社会交换理论与社会自我保存理论,提出竞争性假设,分别阐释创造力通过影响 LMX 对员工绩效的促进效应与抑制效应,揭示员工情绪智力对促进路径的强化作用和对抑制路径的弱化作用。

1.2 社会交换理论：员工创造力正向预测 LMX

社会交换理论指出,个体通过建立互惠规则指导互动,使人际关系逐步发展为更高水平的信任与承诺^[10]。在 LMX 研究领域,互惠原则——当一方给予利益时,受惠方产生回报义务——长期主导着前因机制解释^[7]。领导者为完成组织任务,会优先依赖具备卓越能力与专业技能的追随者^[11];作为双向互惠的体现,此类追随者将获得领导者提供的无形资源(如信任、友谊与支持)与有形资源(如工作保护、信息共享及指导反馈)^[23]。在此过程中,持续的资源交换推动双方超越雇佣契约基础,建立起以相互信任、尊重及责任义务为特征的高质量 LMX^[24];而低质量 LMX 则维持在正式雇佣合同框架内,表现为受角色限制的程式化互动与情感疏离状态。

基于社会交换理论框架,本研究预测员工创造力有助于提升 LMX 质量。LMX 质量取决于下属的胜任力、技能与人格特质等^[25]。员工的创造力主要体现在提出新颖有用的方案以优化流程或解决问题^[26],这类创造性贡献对组织效能提升具有关键价值,因此更易获得领导者的关注与价值认同。在此过程中,领导者通过提供保护性措施、关键信息与建设性反馈等资源支持^[2],促进员工创新构想的实施。同时,创造性员工普遍具备的自信心、行动力与自我驱动

特质^[27],进一步增强了其在任务执行中的效能表现,也能帮助其获取领导者信任与支持。综上,本研究提出以下假设。

H_{1a} : 员工创造力正向预测 LMX。

1.3 社会自我保存理论：员工创造力负向预测 LMX

社会自我保存理论为创造力与 LMX 关系提供了替代性解释机制。社会自我是个体在社会互动中感知到的他人对自身社会地位和价值等的评价^[28]。当个体感知到自身社会自我遭受威胁时,会启动心理、生理与行为的系列保护机制^[12]。社会自我威胁感知更易在以下情境中产生:(1)个体属性、能力或绩效等特质是社会身份和社会价值的关键来源;(2)这些特质正处于被评估状态,且负面评价可能贬损其自身社会地位;(3)存在超出个体控制范围的风险因素^[12]。当面临威胁时,个体会出现下丘脑-垂体-肾上腺轴激活、皮质醇水平升高及焦虑加剧等生理反应,并做出防御行为维护自身的社会地位与价值。

心理学文献主要运用社会自我保存理论解释皮质醇活动(如 Zoccola 等^[29]的研究)。尽管该理论在组织情境中具有普适性,但将其拓展至管理领域解释组织行为的研究相对较少。本研究将社会自我保存理论作为替代性机制,用以阐释创造力通过 LMX 影响工作绩效的作用路径。在领导与下属的互动过程中,领导者掌握着资源分配权,同时承担着管理下属与提升团队效能的责任^[7]。领导者的社会自我主要依赖于其管理能力获得的评价。当感知到来自下属的负面评价或不尊重,或遭遇阻碍团队管理的不可控因素时,领导者的地位与权威将受到威胁,进而触发其防御性反应。

员工创造力可能触发领导者的威胁感知,继而损害 LMX 质量。首先,创造性方案可能引发团队内部冲突。当高创造力员工突破传统工作范式时,既得利益者倾向于维护现有秩序,形成新旧工作模式的对抗^[30]。创意的新颖程度与其可靠性存在天然的矛盾^[31]。同事可能因创意的不确定性与潜在风险而质疑其价值,进而引发人际分歧与冲突^[30]。当团队和谐面临破裂风险时,领导者会将其解读为管理效能与权威地位的受损信号。同时,创造力引发的不可预测性使领导者陷入控制力危机——既无法规避创新失败的连带责任,也难以确保团队绩效稳定。这种复合型威胁将激活领导者的社会自我防御机制,减少对创造性员工的资源支持,导致 LMX 质量下降。综上,本研究提出以下假设。

H_{1b} : 员工创造力负向预测 LMX。

1.4 LMX 的中介作用

LMX 对员工工作绩效的积极影响已获得广泛实

证支持^[24]。在情感性支持方面，高质量 LMX 中的信任积累与积极互动有效增强员工的心理安全感，使其更愿意承担创新风险并将创意转化为绩效提升行动；在工具性支持方面，领导者通过提供关键业务信息、专业发展机会及决策自主权等，为员工优化创意实施方案创造必要条件^[23]。这两类支持的协同作用使员工既能获得创新所需的心理资源，又能掌握将创造力转化为绩效产出的实践能力，进而有效提升工作绩效。

基于双向中介路径的理论整合框架，本研究提出 LMX 在员工创造力与工作绩效间存在方向相反的中介机制。依据社会交换理论，员工创造力通过推动互惠交换提升 LMX 质量、促进员工绩效水平^[10]；而基于社会自我保存理论，高创造力可能触发领导者的社会自我威胁，导致 LMX 关系质量下降，从而危害员工绩效^[12]。两种理论共同构建了 LMX 在创造力-绩效关系中的双向传导模型。综上，本研究提出以下竞争性假设。

H_{2a} ：LMX 在员工创造力与其工作绩效的正向关系中起中介作用。

H_{2b} ：LMX 在员工创造力与其工作绩效的负向关系中起中介作用。

1.5 员工情绪智力的调节作用

社会交换理论与社会自我保存理论对员工创造力与 LMX 关系提出了对立的预测效应：前者强调员工创造力通过资源互惠机制提升 LMX 质量，而后者则提出员工创造力可能因触发领导者的威胁感知而损害 LMX。鉴于社会交换理论^[10]与社会自我保存理论^[12]均强调个体特质是调节其核心理论机制的关键边界条件，本研究将员工情绪智力视为核心调节变量，以调和二者对员工创造力与 LMX 关系的对立预测。情绪智力是指员工处理情绪信息的能力，包括对自身及他人情绪的准确评估、恰当表达及适应性调节^[13]，对职场中高质量社会关系的建立至关重要。实证研究已确认情绪智力对 LMX 的直接促进作用^[32]，但其在创造力-LMX 关系中的调节机制尚待深入探究。高情绪智力员工能精准解读领导情绪信号（如对创新风险的担忧），通过适应性沟通策略（如强调创意的渐进改进性）缓解潜在冲突^[26]，调和上述对立关系。

一方面，员工情绪智力强化创造力对 LMX 的积极效应。卓越的情绪识别能力帮助创造性员工精准捕捉领导者对创新成果的潜在期待（如团队协作增效），并通过主动征询建议持续校准创意方向^[14]，确保创新方案与组织战略目标动态契合，更易获得领导认同。同时，情绪调节能力帮助员工策略性地

优化创意呈现方式（如突出风险缓冲机制），有效缓解领导者对创新不确定性的焦虑^[33]，进而争取更多资源支持。基于上述机制，情绪智力助力创造性员工与领导开展更多互惠交换，LMX 关系质量进一步提升。综上，本研究提出以下假设。

H_{3a} ：员工情绪智力正向调节员工创造力与 LMX 的正向关系，情绪智力水平越高，正向效应越强。

另一方面，员工情绪智力弱化创造力对 LMX 的消极影响。敏锐的情绪洞察力帮助创造性员工及时识别领导对创新风险的隐忧^[26]，通过方案优化提升创意接受度。同时，情绪自我调节能力帮助员工有效抑制创新受阻时的挫败感^[13]，即使遭遇反对，亦能避免负面情绪干扰^[34]，并通过情绪感染传递积极信念，促使领导与同事更易接纳创意，降低创新造成的团队冲突与不确定性风险，逐步缓解领导者对管理权威受损的焦虑。基于上述机制，员工情绪智力通过缓解创造力对领导造成的社会自我威胁，降低对 LMX 质量的危害。综上，本研究提出以下假设。

H_{3b} ：员工情绪智力负向调节员工创造力与 LMX 的负向关系，情绪智力水平越高，负向效应越弱。

综合假设 H_{3a} 与 H_{3b} 可知，高情绪智力使员工创造力更易被领导接纳，进而形成高质量 LMX。由此提出以下整合性假设。

H_{3c} ：员工情绪智力调节员工创造力与 LMX 的关系，当情绪智力水平较高时，员工创造力正向预测 LMX。

基于以上分析，本研究的理论模型如图 1 所示。

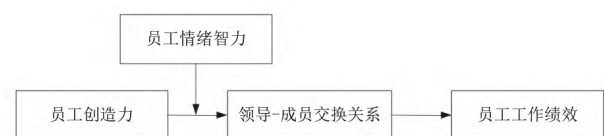


图 1 研究模型

2 研究设计

2.1 样本选择

本研究在中国中部某城市开展问卷调查，通过工商行政部门协调，共有 30 家企业参与调研。最终样本涵盖金融（2 家）、科技（4 家）、房地产（7 家）、商贸（8 家）及制造（9 家）五大行业。

研究采用两阶段追踪设计。第一阶段由各企业人力资源部门协助筛选领导者及其直接下属。领导需完成包含人口统计信息、下属创造力与工作绩效评估的问卷，下属需完成包含人口统计信息、LMX、情绪智力及姓名代码的问卷。领导者与下属在工作时间于独立空间完成问卷填写，并按指导

将问卷密封后送交研究人员。本阶段共发放 630 份员工问卷与 105 份领导问卷，回收 560 份有效员工问卷（回收率 88.89%）与 97 份有效领导问卷（回收率 92.38%）。6 个月后进行第二阶段追踪，560 名员工中共有 328 人完成二次 LMX 测评（追踪率 58.57%），97 位领导中 60 人完成下属绩效复评（追踪率 61.86%）。经数据清洗剔除缺失值后，最终形成 293 组有效领导－下属配对数据（涉及 51 位领导与 293 位员工）。在 51 位团队领导中，女性占比 27.45%，74.51% 的领导拥有本科及以上学历，86.28% 的领导年龄分布在 31 ~ 50 岁之间。在 293 位员工样本中，女性占比 28.67%，59.05% 的员工拥有本科及以上学历，77.82% 的员工年龄分布在 21 ~ 40 岁之间。

2.2 变量测量

除人口统计学信息外，所有测量均采用权威的五点李克特量表（1=“非常不同意”至 5=“非常同意”）。本研究采用双向翻译法避免语义偏差，即由多位经管理领域专家学者先将英文量表译为中文，再回译为英文。经多次比对与修订，以确保量表的等效性。

（1）创造力量表。采用 Oldham 等^[18]编制的创造力量表，共包含 3 个题项，典型条目如“该员工经常提出原创且实用的想法”。该量表的 Cronbach's α 系数为 0.88。

（2）LMX 量表。采用 Graen 等^[9]编制的 LMX 量表，共包含 7 个题项，典型条目如“我的领导非常理解我的工作问题和需求”。该量表的 Cronbach's α 系数为 0.81。

（3）情绪智力量表。采用 Wong 等^[13]编制的情绪智力量表，共包含 4 个维度：自我情绪评估（SEA，4 个题项，典型条目如“我真正理解自己的感受”）、他人情绪评估（OEA，4 个题项，典型条目如“我善于观察他人的情绪”）、情绪调节（ROE，4 个题项，典型条目如“我能很好地控制自己的情绪”）及情绪利用（UOE，4 个题项，典型条目如“我是一个自

我激励的人”）。整体情绪智力量表的 Cronbach's α 系数为 0.85。

（4）工作绩效量表。采用 Welbourne 等^[17]编制的“岗位绩效”量表，共包含 4 个题项，典型条目如“该员工的工作产出量很高”。该量表的 Cronbach's α 系数为 0.80。

（5）控制变量。参考 Gong 等^[2]、Dulebohn 等^[7]及 Martinaityte 等^[8]的研究，控制员工年龄、性别及教育背景、第一阶段的 LMX（Cronbach's α = 0.81）及员工工作绩效（Cronbach's α = 0.70）、员工与领导的人口统计学差异（年龄、性别及教育水平差异）。年龄与教育水平差异采用绝对差值度量。绝对差值越大，差异越显著。性别差异采用虚拟变量表示（0=同性，1=异性）。

3 实证分析

3.1 验证性因子分析

本研究通过验证性因子分析（CFA）检验测量模型的拟合度。初始模型将各变量的单个题项作为观测指标，结果显示模型拟合度较差（ $\chi^2=1\,627.28$ ， $df=402$ ， $RMSEA=0.10$ ， $CFI=0.57$ ， $TLI=0.54$ ， $SRMR=0.10$ ）。其原因可能是情绪智力量表包含 16 个题项，过多待估参数可能导致虚假相关风险上升。因此，本研究又将 16 个题项分维度打包为 4 个潜在因子，即 SEA、OEA、ROE 和 UOE，每个维度通过 4 个题项的平均值表征。情绪智力最终由这 4 个维度作为潜变量指标。通过将多个题目打包成更稳定的观测指标来表征潜变量，不仅减少了模型参数数量、提高了估计效率，还能有效降低虚假相关风险^[35]。

表 1 呈现了情绪智力分维度打包后的验证性因子分析结果。包含 4 个独立潜变量的假设测量模型显示出可接受的拟合度（ $\chi^2=233.16$ ， $df=129$ ， $RMSEA=0.05$ ， $CFI=0.93$ ， $TLI=0.91$ ， $SRMR=0.05$ ）。与所有替代模型相比，假设的变量结构对数据的拟合显著更优（所有卡方差异检验的 P 值均小于 0.001）。

表 1 多层次验证性因子分析结果

模型	因子数量	χ^2	df	χ^2/df	RMSEA	CFI	TLI	SRMR	$\Delta\chi^2$
预测模型	CRE, LMX, EI, PER	233.16	129	1.81	0.05	0.93	0.91	0.05	—
模型 1	CRE, LMX+EI, PER	362.17	132	2.74	0.08	0.84	0.81	0.08	129.01***
模型 2	CRE+PER, LMX, EI	530.29	132	4.02	0.10	0.72	0.68	0.10	297.13***
模型 3	CRE+LMX+EI, PER	823.38	134	6.14	0.13	0.52	0.45	0.15	590.22***
模型 4	CRE+LMX+EI+PER	1 110.92	135	8.23	0.16	0.32	0.23	0.17	877.76***

注：1）CRE 为员工创造力，LMX 为领导－成员交换关系，EI 为员工情绪智力，PER 为员工工作绩效；2）—表示不参与分析；3）***、**、* 分别表示在 1%、5%、10% 的显著性水平。下同。

3.2 描述性统计与相关性分析

表 2 呈现了各变量的均值、标准差及相关系数矩阵。员工创造力与 LMX 呈显著正相关，与工作绩

效亦存在显著正向关联。LMX 与员工工作绩效之间同样表现出显著的正向关系。这些结果为后续分析提供了初步的实证支持。

表 2 描述性统计结果与相关系数 (N=293)

变量编号及名称	变量编号											
	1	2	3	4	5	6	7	8	9	10	11	12
1 年龄	—											
2 性别	0.11	—										
3 教育水平	-0.08	-0.01	—									
4 年龄异质性	-0.44*	-0.07	0.06	—								
5 性别异质性	-0.17**	-0.49**	0.03	0.17**	—							
6 教育水平异质性	0.02	-0.10	-0.40**	0.04	0.13*	—						
7 先前 LMX	-0.10	-0.02	-0.11	> -0.01	< 0.01	0.08	—					
8 先前工作绩效	0.02	0.05	-0.03	-0.04	-0.04	-0.04	-0.01	—				
9 员工创造力	-0.13*	0.12*	-0.03	0.10	0.10	-0.06	0.02	0.47**	—			
10 LMX	-0.10	0.04	0.03	-0.08	-0.08	-0.05	0.09	0.09	0.13*	—		
11 员工情绪智力	-0.13*	-0.01	> -0.01	0.02	0.02	-0.09	0.31**	0.05	0.09	0.10	—	
12 员工工作绩效	-0.03	0.04	-0.12*	-0.02	-0.02	0.01	-0.02	0.19**	0.26**	0.14*	0.01	—
平均值	2.852	0.709	2.594	1.113	0.372	0.607	3.594	3.647	3.335	3.713	3.756	3.752
标准差	0.857	0.453	0.741	0.767	0.475	0.642	0.454	0.491	0.668	0.435	0.353	0.542

3.3 假设检验

尽管本研究聚焦于个体层面分析，但采用分层线性模型（hierarchical linear modeling, HLM）以控制同一领导者评价的员工数据间的相互依赖性。LMX 和工作绩效的组间方差占总方差的比例分别为 39.09% 和 21.47%（均通过 $P<0.001$ 显著性检验）。该结果表明，结果变量存在团队层面的集群效应，需通过 HLM 处理数据嵌套问题。此方法符合员工嵌套于团队的现实情境，能有效控制工作绩效的组间差异。数据结果显示，即便采用普通最小二乘法（OLS）回归进行独立检验，所有研究假设的显著性方向与 HLM 分析结果一致。

假设 H_{1a} 预测员工创造力对 LMX 存在正向作用，假设 H_{1b} 则提出负向关系。检验过程分两阶段建模：第一阶段以 LMX 为因变量对控制变量进行回归分析，第二阶段引入员工创造力进行回归分析。HLM 分析结果如表 3 所示，模型 2 中员工创造力显著正向影响 LMX，该结果支持假设 H_{1a} 成立，同时拒绝假设 H_{1b} 。

假设 H_{2a} 与 H_{2b} 提出 LMX 在创造力与工作绩效间起中介作用。由于假设 H_{1b} 没有得到验证， H_{2b} 即“LMX 在员工创造力与工作绩效的负向关系中起中介作用”被拒绝。为验证假设 H_{2a} ，在控制人口学变量后，本研究检验加入 LMX 之后员工创造力对工作绩效的影响。如表 3 模型 5 所示，在加入 LMX 后，员工创造力对工作绩效的回归系数虽降低（从 0.21 降至 0.19）但仍保持显著，说明 LMX 存在部分中介作用。因此，假设 H_{2a} 成立。进一步地，本研究运用多层级中介检验方法，发现员工创造力通过 LMX 对工作绩效的间接效应显著；运用偏差校正 Bootstrap 法（结果如表 4 所示），发现员工创造力通过 LMX 对工作绩效的间接效应显著为正，间接效应值为 0.09，95% 置信区间（CI）为 [0.001, 0.034]，不包含 0。上述结果验证了假设 H_{2a} 。

表 3 分层线性模型分析结果（中介效应）

变量	LMX		员工工作绩效		
	模型 1	模型 2	模型 3	模型 4	模型 5
截距	3.08***	2.79***	3.25***	3.02***	2.50***
年龄	-0.05	-0.03	-0.04	-0.01	0.01
性别	0.04	0.03	0.04	0.01	0.00
教育水平	0.04	0.05	-0.12*	-0.12*	-0.12*
年龄异质性	0.05	0.04	0.05	0.05	0.03
性别异质性	-0.09	-0.09	-0.02	-0.03	-0.04
教育水平异质性	0.03	0.04	0.01	0.03	0.03
先前 LMX	0.08	0.07	—	—	—
先前工作绩效	—	—	0.19**	0.09	0.09
员工创造力	—	0.12*	—	0.21**	0.19**
LMX	—	—	—	—	0.14*

表 4 间接效应检验结果

路径	员工创造力→LMX→员工工作绩效
Bootstrap- 间接效应	0.01
标准差	0.01
95% CI	[0.001, 0.034]

假设 H_{3a} 提出员工情绪智力正向调节员工创造力与 LMX 的正向关系，假设 H_{3b} 提出员工情绪智力负向调节员工创造力与 LMX 的负向关系。为检验调节效应，在控制人口学变量后，本研究采用分层回归方法，依次构建员工创造力对 LMX 的主效应模型、纳入创造力与情绪智力的主效应模型，以及加入创造力与情绪智力交互项的完整模型。

依次将 LMX 对创造力、情绪智力、创造力与情绪智力的交互项进行回归分析。表 5 中的模型 9 显示，创造力与情绪智力的交互项对 LMX 具有显著正向预测作用，表明情绪智力增强了创造力与 LMX 之间的正向关系。因此，假设 H_{3a} 成立，而假设 H_{3b} 被拒绝。

表 5 分层线性模型分析结果（调节效应）

变量	LMX			
	模型 6	模型 7	模型 8	模型 9
截距	3.08***	2.79***	2.78***	3.27***
年龄	-0.05	-0.03	-0.03	-0.03
性别	0.04	0.03	0.03	0.03
教育水平	0.04	0.05	0.05	0.04

表 5 (续)

变量	LMX			
	模型 6	模型 7	模型 8	模型 9
年龄异质性	0.05	0.04	0.04	0.03
性别异质性	-0.09	-0.09	-0.08	-0.08
教育水平异质性	0.03	0.04	0.04	0.04
先前 LMX	0.08	0.07	0.07	0.05
员工创造力	—	0.12*	0.11*	0.10
员工情绪智力	—	—	0.05	0.05
员工创造力 × 员工情绪智力	—	—	—	0.11*

进一步进行简单斜率分析表明，当情绪智力高于均值 1 个标准差 (+1SD) 时，创造力对 LMX 的正向效应显著 ($\beta=0.16, P < 0.05$)；而当情绪智力低于均值 1 个标准差 (-1SD) 时，该效应不显著 ($\beta=0.08, P > 0.10$)。交互效应图 (图 2) 直观呈现了情绪智力对创造力-LMX 关系的增强效应，支持假设 H_{3c} 。

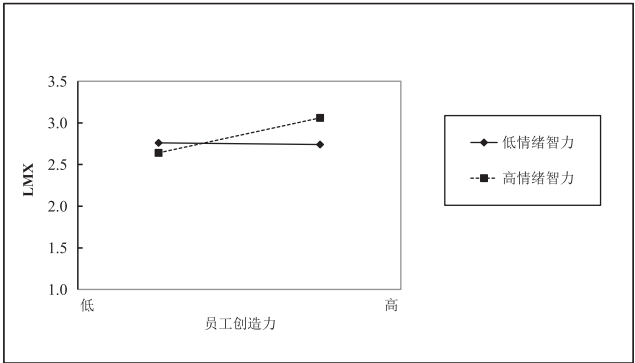


图 2 调节效应结果

基于 LMX 的中介效应与情绪智力的调节作用，本研究进一步检验有调节的中介效应。通过采用 Bootstrap 法 (抽样 5 000 次) 进行条件间接效应分析发现，对于高情绪智力的员工 (+1SD)，创造力通过 LMX 提升其工作绩效的间接效应显著 ($\beta=0.05, P<0.05; 95\%CI=[0.015, 0.106]$)；而对于低情绪智力员工 (-1SD)，该间接效应不显著 ($\beta<0.001,$

$P>0.1; 95\%CI=[-0.105, 0.066]$)。组间差异检验进一步证实，对于高情绪智力与低情绪智力员工，创造力通过 LMX 提升其工作绩效的间接效应差异显著 ($\Delta\beta=0.05, P<0.05; 95\%CI=[0.001, 0.071]$)。上述结果表明，员工情绪智力正向调节员工创造力通过 LMX 影响工作绩效的中介路径：当员工情绪智力水平较高时，创造力通过促进 LMX 关系进而提升工作绩效的效应更强；反之，该效应被显著削弱。

3.4 内生性检验

本研究采用工具变量法检验潜在的内生性问题。基于理论分析与实证验证，选取员工感知的团队凝聚力作为工具变量。团队凝聚力的测量采用 Michalisin 等^[36]开发的 6 题项量表 (Cronbach's $\alpha=0.89$)，反映团队成员为实现目标而协作的倾向性。在理论层面，团队凝聚力与个体创造力存在关联 ($\beta=0.18, P<0.05$)，但与 LMX 无直接关系 ($\beta=0.01, P>0.1$)，符合工具变量的外生性与相关性要求。

随后采用两阶段最小二乘法 (2SLS) 进行估计。在第一阶段，将员工创造力对控制变量及工具变量进行回归分析 (见表 6)。模型 11 的结果显示，加入工具变量后，回归模型的 R^2 较仅含控制变量的模型显著提高 ($\Delta R^2=0.05, P<0.05$)，表明团队凝聚力可作为创造力的有效工具变量。在第二阶段，基于模型 11 的结果计算创造力的预测值，随后将 LMX 对控制变量及创造力预测值进行回归分析。表 6 模型 15 的结果显示，创造力预测值与 LMX 呈显著正向关联 ($\beta=0.17, P<0.05$)，与表 6 模型 13 的 OLS 结果 ($\beta=0.14, P<0.05$) 及表 3 模型 2 的 HLM 结果 ($\beta=0.12, P<0.05$) 一致。进一步采用 Durbin-Wu-Hausman 检验，本研究将 LMX 对控制变量、工具变量及创造力误差项 (取自 2SLS 第一阶段) 进行回归，结果显示创造力误差项与 LMX 无显著关联 ($\beta=0.07, P>0.1$)，证实创造力变量在本研究模型中不存在显著的内生性偏误。

表 6 包含工具变量的两阶段最小二乘回归结果

变量	员工创造力		LMX			
	模型 10 (OLS)	模型 11 (OLS)	模型 12 (OLS)	模型 13 (OLS)	模型 14 (OLS)	模型 15 (2SLS)
年龄	-0.14**	-0.13*	-0.13*	-0.12	-0.13*	-0.13*
性别	0.13*	0.13*	0.01	0.01	0.01	0.03
教育水平	-0.09	-0.08	0.04	0.05	0.04	0.04
年龄异质性	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01
性别异质性	0.07	0.07	-0.13*	-0.13*	-0.13*	-0.15*
教育水平异质性	-0.09	-0.09	-0.02	-0.02	-0.02	-0.03
先前 LMX	—	—	0.19**	0.19**	0.19**	0.21**
员工感知团队凝聚力	—	0.18*	—	—	0.01	—
员工创造力	—	—	—	0.14*	—	0.17*
R^2	0.05	0.11	0.08	0.12	0.08	0.13
ΔR^2	0.05*	0.05*	0.08**	0.04*	0	0.05**
F 值	2.57*	4.12**	3.60**	4.93***	3.14**	5.21***

4 结论与展望

4.1 研究结论

本研究聚焦于“员工创造力对其工作绩效的影响机制”这一被广泛关注但作用机制尚不明确的核心问题，通过构建以 LMX 为中介、员工情绪智力为调节的整合模型，系统揭示了员工创造力与其工作绩效间的传导路径与边界条件。无论是早期探索（如 Oldham 等^[18]）还是近期成果（如 Halinski 等^[37]），多聚焦于创造力对绩效的直接影响，而对“创造力如何转化为绩效”的深层中介机制探讨相对不足^[38]。作为少有的系统分析中介机制的研究，本研究证明员工创造力通过提升 LMX 质量间接促进工作绩效。具体而言，具有较高创造力的员工更容易在与领导的互动中展示其工作能力和潜在价值，从而获得领导更多的信任与支持，形成高质量的 LMX 关系。这一互惠交换过程进一步促进了其工作绩效的提升，揭示了员工创造力通过帮助其获取关系资本而促进绩效产出的作用链条。

进一步分析表明，员工创造力对 LMX 质量的促进作用受到员工情绪智力的显著调节。只有在情绪智力较高的员工群体中，创造力才能有效转化为领导与成员间的积极互动。高情绪智力的个体通过更敏锐的情绪洞察与自我调节能力，能够在创造性表达中平衡创新与人际适应，从而缓解领导者可能产生的威胁感知，使创造性行为被解读为组织价值的体现，而非挑战权威的信号。在这一过程中，创造力激活的社会交换机制得以顺利运行，促成高质量的 LMX 关系，并最终转化为绩效优势。相反，对于情绪智力较低的员工，其创造性想法可能因表达方式欠妥或沟通敏感度不足，而未能获得领导的积极回应，导致创造力未能转化为关系资本，也难以进一步提升绩效。

调节效应的发现不仅有助于深入理解创造力与绩效间的关系，也为解释创造力的双面性提供了新的视角。在现有研究中，关于创造力促进绩效与抑制绩效的分歧，在本研究的模型下得以整合。创造力并非单一的正向或负向力量，其效能取决于个体的情绪智力水平。当员工能够以高情绪智力管理创造性表达所带来的风险时，创造力更可能通过 LMX 机制促进绩效；反之，则可能因触发领导的自我威胁感知，而削弱其正向效应。这一结果表明，情绪智力是创造力实现绩效转化的关键个体能力边界条件，也揭示了创造力效应差异背后的心理与关系机制。

同时，研究结果对两类理论路径提供了经验证据支持。根据自我保存理论，领导者可能因下属的高创造力而感到威胁，并采取抑制性反应。然而，

本研究的结果更符合社会交换理论的逻辑，即领导者往往基于员工创造力所体现的潜在价值，与其建立更高质量的交换关系，并给予相应的资源支持。这一结论与 Graen 等^[9]提出的 LMX 核心原则相契合，也为 Martinaityte 等^[8]关于“领导支持是高创造力转化为高绩效的关键桥梁”的观点提供了实证印证。由此，创造力对绩效的影响不应仅理解为个体能力直接作用的结果，也可视为个体能力通过社会交换网络实现资源再分配的过程。

综上，本研究揭示了员工创造力通过 LMX 作用于其工作绩效的间接机制，并指出员工情绪智力是该机制得以发挥的重要条件。本研究从社会交换视角出发，将创造力的绩效转化置于动态的领导与成员互动之中，既回应了学界关于“创造力如何转化为绩效”的理论呼吁，也推动了创造力研究从“是否有效”的二元争论向“何种条件下、通过何种关系机制实现有效”的理论深化。

4.2 管理启示

组织需要系统性构建创造力价值效能转化机制。本研究发现员工创造力显著促进员工工作绩效，验证了其在组织中的重要价值。组织可通过构建基于创造力的人才选拔体系，并塑造充满活力与自主性的组织文化，以吸引高创造力员工。针对现有员工，领导者可通过建立创新培训机制与成果奖励制度，赋予其执行非常规但有益想法的自主权，激励其开发并应用新颖想法，并通过绩效反馈系统明确认可创造力带来的组织效益，以强化创造力向绩效的持续转化。

管理者与员工需认识到 LMX 质量是创造力转化为工作绩效的关键桥梁。本研究证实员工创造力通过提升 LMX 质量间接促进工作绩效。据此，管理者应构建常态化沟通机制，确保领导与员工就创新方案进行双向交流，使员工在战略框架内提出更具可行性的创意，同时增强 LMX 质量。当领导者认可创造力的价值时，需通过资源倾斜强化创新与绩效的关联性，使员工明确感知组织对创造力的支持。尽管本研究未发现创造力直接损害 LMX 的实证依据，管理者仍需注意过度创新可能引发的领导权威担忧，可通过跨部门协作培训等活动减少创造性员工与同事的认知冲突，从而降低领导者对管理失控的隐忧。

组织应实施创造力与情绪智力协同发展策略。本研究发现仅高情绪智力的员工能通过 LMX 路径高效转化创造力为绩效，这提示组织仅关注员工创造力不足以保障高绩效，需在人才选拔与培养中同步评估创造力与情绪智力水平，优先录用创造力与情绪智力“双高”的复合型人才。当高创造力员工绩

效未达标时，可开展员工情绪智力水平评估，识别低情绪智力的创造性员工，设计针对性的情绪能力提升项目（如情绪日志训练、情境模拟工作坊），强化其情绪识别与调节能力，从而激活创造力通过提升 LMX 促进绩效的作用路径。

4.3 研究局限与未来研究方向

首先，本研究采用两阶段调研设计验证理论模型，因果推断效度存在固有局限。尽管“创造力通过 LMX 影响工作绩效”的核心假设具有坚实的理论根基，且通过内生性检验证实核心变量间未发现显著的内生性偏误，但为证明研究结论的稳健性，建议未来研究采用实验法系统操纵员工创造力水平，结合多时点纵向数据追踪设计，进一步验证本研究模型的因果链。其次，本研究聚焦 LMX 的中介作用与员工情绪智力的调节作用，揭示了二者在创造力－绩效关系中的关键地位。未来研究可拓展其他潜在机制与边界条件。例如，在作用机制方面，除 LMX 外，可考察创造力通过团队成员交换影响绩效的路径；在边界条件方面，当前研究仅识别出创造力发挥积极作用的条件下，后续可探索创造力产生负面效应的情境（如领导权力不安全感、组织刚性等），以全面揭示创造力作用的“双刃剑”特性。

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