申报	系列：图书资料
	专业：图书馆学
	职称：副研究馆员

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）：　图书馆

姓　名　刘 洋

材料核对人：　　单位盖章：

核对时间：

华南农业大学制

目　录

一、教学研究业绩 3

1.1 教学研究项目 4

1.1.1 双链融合的农业知识产权创新人才培养模式构建(PCE2234)（C 类） 4

1.1.2 农业数字化背景下高校研究生知识产权素养培育的创新模式研究(24YZYXWJG-ZPJG16) 12

1.1.3 教改课题基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例（JG19072） 15

1.2 教学改革论文 24

1.2.1 Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking (B 类) 24

1.2.2 基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例 43

二、科研项目 52

2.1 主持的项目 53

2.1.1 高校图书馆信息服务绩效评价体系构建--以知识产权信息服务为例相关材料(B 类) 53

2.1.2 新时期网络舆情对大学生情感取向演化的模型研究相关材料（2020WQNCX007）(C 类) 58

2.2 主要参加的项目 67

2.2.1 粤港澳联合承办十五运会和残特奥会对体育场馆数智技术发展与治理效果的研究(C 类) 67

2.2.2 基于全寿命周期绿色体育场馆建设管理的研究(C 类) 75

三、科研成果 82

3.1 学术论文 83

3.1.1.检索证明 83

3.1.2.以第一作者发表本专业论文情况（B 类 2 篇，A 类 1 篇，C 类 1 篇） 85

3.1.3.以通讯作者发表本专业论文情况 166
3.2 科技奖励 174
3.2.1 2020 年优秀科技情报成果奖 174
3.3 科研平台 175
3.3.1 广东省高校知识产权信息服务中心建设项目 175
3.3.2 广州市知识产权公共服务运行项目 183
四、其他业绩 187
4.1 指导学生学科竞赛 188
4.1.1 第四届“羊城 IP 杯”优秀指导教师 (C 类) 188
4.1.2 第三届“羊城 IP 杯”优秀指导教师 (C 类) 188
4.1.3 2022"智慧芽杯"高校专利检索大赛--全国总决赛优秀指导老师 189
4.2 个人荣誉 190
4.2.1 2025 年年度考核优秀 190
4.2.2 2020 年年度考核优秀 191
4.2.3 “百千万工程”优秀指导教师 192
五、其他获奖和业绩材料 193
5.1 2019 年图书馆年度考核馆内优秀 194
5.2 教育部优秀征文二等奖 196
5.3 广东省知识产权信息服务优秀案例 196
5.4 参与省内知识产权公共服务网点建设情况评估并获“优秀” 197
5.6 获教育部科技查新员资格 202
5.7 获知识产权管理体系内审员资格 203
5.8 高校知识产权信息服务中心联盟培训 204
5.9 通过教育部高等学校图书情报工作指导委员会信息素质培训 204

一、教学研究业绩

1.1 教学研究项目

1.1.1 双链融合的农业知识产权创新人才培养模式构建(PCE2234)（C 类）

（1）立项书

中 国 农 学 会

中国农学会教育教学类第八批科研课题立项通知书

_____ 同志：

经专家评审和中国农学会审批，您申报的_____已获准立项为_____课题，批准号为：_____

中国农学会教育教学类第八批科研课题申请一经批准，其《申报书》即成为有约束力的协议，课题主持人须严格按照《申报书》中填写的相关内容，认真开展研究工作，取得预期研究成果。为规范课题管理，课题主持人及其所在单位须了解以下规定：

一、资助课题经费一万元一次性划拨至课题主持人所在单位，建议相关单位给予本单位资助课题主持人不低于二万元的配套经费支持，给予本单位立项课题主持人不低于一万元的经费支持。

二、课题完成时间为2024年12月31日前，成果形式为研究论文，论文必须公开发表在中国农学会教育专业委员会指定的期刊上（目录见附件），并标注本项目资助（名称和编号）。

三、若变更课题主持人、课题完成时间等，须由课题立项时主持人所在单位提出书面申请，报中国农学会教育专业委员会批准。

四、目前部分课题经费暂未到位，课题主持人可先行开展研究工作，待经费到位后即刻拨付。

\

附 件 ：1. 中国农学会教育教学类第八批教育教学类课题立项名单

2. 中国农学会教育专业委员指定期刊目录



中国农学会

2022年12月20日

附件1

中国农学会教育教学类第八批教育教学类课题立项名单

一、立项资助课题(11项)

课题编号	单位	姓名	课题名称
PCE2201	华南农业大学	彭思喜	乡村振兴战略下农林院校教育发展人才培养战略研究
PCE2202	东北林业大学	邹玉友	面向“三新”的农林高校新农科建设绩效提升路径研究
PCE2203	中国农业大学	吴嘉琦	高等教育经费配置对农林人才培养质量的影响研究
PCE2204	西北农林科技大学	豆书龙	嵌合性视角下涉农高校服务乡村振兴的长效机制研究
PCE2205	东北农业大学	孙楠	农林类院校创新创业教育生态系统构建
PCE2206	中央农广校	魏亚萍	农民田间学校线上线下教育培训融合路径研究
PCE2207	吉林农业科技学院	王帅	新农科背景下应用型人才产教融合培养模式研究
PCE2208	河北农业大学	祝丽云	新农科视角下农业院校教学质量评价及提升路径研究
PCE2208	山西农业大学	张丽	有效性视角下农科高校教师职称制度改革路径优化研究
PCE2210	华中农业大学	金安江	基于生命健康链的跨学科人才培养的探索与实践
PCE2211	南京农业大学	李二斌	学术期刊服务学会高质量发展的路径探索与思考

二、立项课题(23项)

课题编号	单位	姓名	课题名称
PCE2212	四川农业大学	吴德	产教融合背景下地方农业大学新农科人才培养模式研究
PCE2213	西北农林科技大学	王倩	农林院校创新创业教育生态系统建构及评价研究
PCE2214	华南农业大学	张建桃	基于文本挖掘的新农科人才跨学科能力需求分析与培养探索
PCE2215	华南农业大学	李楠	基于科教融合的研究型实验教学模式探索与实践

PCE2216	西北农林科技大学	宋瑜龙	种业产教融合人才培养模式的探索与实践
PCE2217	东北林业大学	高玉娟	乡村振兴战略背景下创新创业型农业硕士培养模式优化研究
PCE2218	东北农业大学	崔嵩	产学研协同优化新农科研究生培养模式与评价体系构建
PCE2219	中国农业大学	史博	农林高校“双方位+四平台”全链条导学关系新模式构建研究
PCE2220	东北林业大学	曲发义	农林类高校学科建设动态监测及自评估机制的探索与实践
PCE2221	南京农业大学	章棋	农林高校人工智能专业人才培养模式创新的实现路径研究
PCE2222	华中农业大学	刘广乐	农业高校创业教育历史、现状与对策研究
PCE2223	山东畜牧兽医职业学院	李鑫	乡村振兴背景下农林类高职学生劳动教育实施路径研究
PCE2224	扬州大学	张荣天	面向乡村振兴的农林院校农业硕士人才培养路径建构
PCE2225	福建农林大学	坚瑞	农林院校高质量“五育并举”教师培训体系研究
PCE2226	江苏农牧科技职业学院	陈熔	“一带一路”背景下农业职业院校国际学生跨文化能力培养与研究
PCE2227	湖南生物机电职院	曹敏志	教育4.0背景下校企协同多元管理顶岗实习评价机制研究
PCE2228	苏州农业职业技术学院	秦昌友	产学深度融合下农业类高职院校应用型人才培养模式探究
PCE2229	河北农业大学	勾俊芳	农业院校工科PBL下《工程结构》TJA增值性评价探索
PCE2230	南京农业大学	葛焱	依托产教融合创新平台的专业硕士联合培养模式研究
PCE2231	仲恺农业工程学院	王正梅	教育评价改革背景下农林本科院校思政理论课教学质量评价体系研究
PCE2232	安徽农业大学	宋有洪	麦玉周年栽培技术智慧化升级培养双创人才
PCE2233	浙江农林大学	钱晓虎	地方农林高校助力乡村振兴实施路径与策略研究
PCE2234	华南农业大学	刘洋	双链融合的农业知识产权创新人才培养模式构建

（2）结项书



中国农学会教育教学类科研课题

结题证书

项目类别：立项课题

项目名称：双链融合的农业知识产权创新人才培养模式构建

课题主持人：刘　洋　　主要参加人：何效平　刘熙东　陈铃诗　黄春晓

批　准　号：PCE2234　　程燕锋　吴贤奇　欧　群　张　琴

本项目经审核准予结题，特发此证。

证书编号：20250027

中国农学会

2025年12月20日

（2）部分申请书

附件2

中国农学会教育教学类科研课题

申　　报　　书

课　题　名　称：双链融合的农业知识产权创新人才培养模式构建

课 题 负 责 人：刘 洋

负责人所在单位：华南农业大学

填　表　日　期：2022.11.20

中国农学会教育专业委员会秘书处　制

2022 年 9 月修订

一、课题组负责人及主要成员

课题名称	双链融合的农业知识产权创新人才培养模式构建						
负责人姓名	刘洋	性别	女	民族	汉族	出生年月	1989.11
行政职务		专业职称	馆员			研究专长	专利分析，知识产权信息素养教育
最后学历	硕士	联系电话	15919683294				
工作单位	华南农业大学图书馆					电子信箱	liuy@scau.edu.cn
通讯地址	广东省广州市天河区华南农业大学					邮编	510642

主要参加者	姓　名	性别	出生年月	学历	职称	研究专长	工作单位
	何效平	女	1974.7	硕士	馆员	专利导航，知识产权教育	华南农业大学图书馆
	刘熙东	男	1974.12	硕士	副研究馆员	专利导航分析	华南农业大学图书馆
	陈铃诗	女	1987.7	硕士	助理馆员	知识产权教育	华南农业大学图书馆
	黄春晓	女	1979.8	硕士	馆员	专利查新	华南农业大学图书馆
	程燕锋	女	1981.1	硕士	副研究馆员	专利导航分析	华南农业大学图书馆
	吴贤奇	男	1974.10	硕士	副研究馆员	学科情报分析	华南农业大学图书馆
	欧群	女	1974.6	硕士	副研究馆员	信息素养教育	华南农业大学图书馆
	张琴	女	1979.8	博士	馆员	信息素养教育	华南农业大学图书馆

课题负责人所在单位	开户行	广州工行五山支行
	统一社会信用代码	124400004554165634
	银行账号	3602002609000310520

二、课题论证

1.本课题国内外研究现状述评及研究意义。2.研究的主要内容、基本思路和方法、重点难点、主要观点。3.主要对策建议或理论创新之处。4.前期相关研究成果和主要参考文献。限3000字以内。

农业为本，本固邦兴。党的十八大以来，党中央国务院高度重视农业农村发展，提出要做好“三农”工作，持续全面推进乡村振兴。党的二十大报告提出，坚持农业农村优先发展，巩固拓展脱贫攻坚成果，加快建设农业强国，扎实推动乡村产业、人才、文化、生态、组织振兴[1]。可见农业创新人才培养是推动农业发展的重要抓手。农业科技创新离不开农业知识产权保护。加快培养拥有知识产权信息素养的创新性农业人才，深刻把握新形势、新特点、新任务，推动新农科建设，是当代农业高校人才培养的重要目标[2]

一. 研究现状及研究意义

知识产权是国家的核心竞争力之一，而提升知识产权能力,知识产权素养教育必不可少。近年我国相继出台《高等学校知识产权管理规范》、《高校知识产权信息服务中心建设实施办法》和《关于强化知识产权保护的意见》指出，高校应承担开展知识产权素养教育，宣讲普及知识产权知识及技能等活动。这为高校图书馆、高校知识产权信息服务中心开展相关教育提供政策指引[3]。

知识产权素养教育是信息素养教育的延伸，由于提出时间较短加之多

1.1.2 农业数字化背景下高校研究生知识产权素养培育的创新模式研究 (24YZYXWJG-ZPJG16)

（1）立项书



关于2024年华南农业大学研究生教育创新计划项目拟立项名单的公示

发布者：研究生院 发布时间：2024-04-16 浏览次数： 856

关于2024年华南农业大学研究生教育创新计划项目拟立项名单的公示

各有关单位：

根据《关于开展2024年华南农业大学研究生教育创新计划项目申报工作的通知》要求，研究生院组织开展了2024年校级研究生教育创新计划及专业学位研究生创新型实践教学改革研究项目立项申报工作。经个人申报、单位推荐、形式审查和专家评审等程序，现将拟立项名单予以公示。

公示时间为2024年4月16日至4月22日。公示期内如有异议，请实名向研究生院反映。

联系人：潘科

电话：85280189

研究生院

2024年4月16日

（七）专业学位研究生实践教学资源建设与培养模式改革研究项目	1	基于专题驱动的《智慧农业理论与实践》教学方法探索	农艺与种业	张雷	农学院
	2	乡村振兴战略下林业专业硕士实践能力培养模式改革创新探索	林业	李青粉	林学与风景园林学院
	3	智慧养殖研究生专项建设与实践	畜牧	闫希亮	动物科学学院
	4	低碳农业背景下《生态环境材料学》交叉课程体系的构建	环境科学	朱雁平	资源环境学院
	5	“三位一体”协同育人创新型乡村振兴人才培养模式探究	水产、渔业发展	赵会宏	海洋学院
	6	咸淡水水域环境的养护与治理教学课程改革	水产、渔业发展	王俊	海洋学院
	7	产教融合食品工程专业学位研究生培养的导向性改革与实践	食品工程	黎攀	食品学院
	8	科技赋能农业专业硕士班级培养模式	农业工程	岳学军	电子工程学院（人工智能学院）
	9	专业硕士学位论文质量提升策略探究	农林经济管理	贺梅英	经济管理学院
	10	基于国际视野的“双一流”涉农高校金融专业硕士培养模式改革研究	金融学	董莹	经济管理学院
	11	参与式案例教学在公共管理硕士培养的应用及创新	公共管理	吴彦	公共管理学院
	12	基于SWOT分析的专业学位研究生教育高质量发展策略研究－以华南农业大学MPA教育为例	教育管理	宋星洲	公共管理学院
	13	新时代法硕课程思政融入研究----以华南农业大学法硕课程教学为例	法学	林友	人文与法学学院
	14	AI时代MTI翻译硕士的智能化实践教学改革研究	英语笔译	陈喜华	外国语学院
	15	双创驱动下艺术硕士专业工作室人才培养模式研究与实践	艺术学	盘湘龙	艺术学院
	16	农业数字化背景下高校研究生知识产权素养培育的创新模式研究	图情信息	刘洋	图书馆
	1	面向智慧农业的《数字图像处理》课程案例库建设	计算机应用技术	崔金荣	数学与信息学院

（2）结项书

华南农业大学研究生教育创新计划项目

结题通知书

刘洋 同志：

您承担的2024年华南农业大学研究生教育创新计划项目“专业学位研究生实践教学资源建设与培养模式改革研究项目：农业数字化背景下高校研究生知识产权素养培育的创新模式研究”（项目批准号：24YZYXWJG-ZPJG16），已按相关规定完成审核，准予结题。

特此通知。

华南农业大学研究生院

2025年10月11日

1.1.3 教改课题基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例（**JG19072**）

（1）立项书

华南农业大学文件

华南农教〔2019〕61号

关于华南农业大学2019年度教育教学改革与研究项目立项的通知

各学院、部处、各单位:

为进一步推进我校教育教学改革与研究，提高人才培养质量，根据《教育部关于加快建设高水平本科教育全面提高人才培养能力的意见》（教高〔2018〕2号）精神，学校组织开展了2019年度教育教学改革与研究项目申报工作。经组织申报、资格审查、专家评审、公示等环节，确定“马克思主义情景剧与原理课实践教学改革研究”等154项校级教育教学改革与研究项目予以立项。其中，针对学校本科人才培养改革重点领域，本年度特设思想政治理论课专项10项，课程思政专项11项，青年专项41项，金课改革专项33项。具体立项和资助情况详见附件。

请各项目负责人务必按项目计划要求及时开展研究工作，确

保研究工作如期完成，并力争取得高水平的研究成果。

附件：华南农业大学2019年度教育教学改革与研究项目一览表

华南农业大学

2019年9月27日

（联系人：曹广祥、伍鹏，电话：85280052）

公开方式：主动公开

华南农业大学校长办公室　　2019年9月29日印发

	—以《旅游市场营销》课程为例			
JG19067	“线上+线下”的遗传学实验混合教学模式探索研究	郭海滨	金课改革	一般资助
JG19068	基于慕课的《林木育种学》混合式教学方法探索	骈瑞琪	金课改革	一般资助
JG19069	《养羊学》课程内容优化及微课、翻转课堂在教学实践中的应用研究	柳广斌	金课改革	一般资助
JG19070	基于“线上”+“线下”的《生物信息学》课程混合式教学模式研究与实践	王波	金课改革	一般资助
JG19071	“金课”视域下城乡规划专业中外建筑史混合式教学模式探索与实践	吴宝娜	金课改革	一般资助
JG19072	基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例	刘洋	金课改革	一般资助
JG19073	“互联网+”翻转课堂的智慧微学习空间建设研究与实践——以华南农业大学为例	江晓庆	金课改革	一般资助
JG19074	新工科背景下高等数学混合式金课的研究与实践	刘丹	金课改革	一般资助
JG19075	“翻转+对分”混合教学模式研究--以《跨文化交际》课程为例	钟建玲	金课改革	一般资助
JG19076	《动物解剖学-感觉器官》章节基于雨课堂翻转教学模式设计与实践	许丹	金课改革	一般资助
JG19077	以打造“金课”为导向促进教师教学能力提升的探索和实践	钟建英	金课改革	自筹
JG19078	项目驱动下统计学专业实践混合式教学的创新研究	周燕	金课改革	自筹
JG19079	翻译技术辅助大学英语翻译混合式教学模式有效性研究	李志英	金课改革	自筹
JG19080	基于 SPOC“农业植物病理学实习”线上线下混合式教学的创新实践	纪春艳	金课改革	自筹
JG19081	基于翻转课堂的高校图书馆信息素养教育模式研究	关磊	金课改革	自筹
JG19082	线上线下混合式教学模式在法学专业课程中的应用研究	李福芹	金课改革	自筹
JG19083	基于翻转课堂的细胞生物学综合性实验教学改革	彭海峰	金课改革	自筹
JG19084	“雨课堂”混合式教学工具在兽医外科手术学教学中的应用研究	周沛	金课改革	自筹
JG19085	基于能力培养的多层级探究式教学改革研究及实践--以《土木工程材料》为例	李庚英		重点资助
JG19086	新工科背景下多维度提升工科高数课程教学质量的研究与实践	李娇娇		重点资助
JG19087	以科研成果促进遗传学实验教学创新改革的研究与实践	刘自强		重点资助

（2）结项书

附件：　　2021年度校级质量工程暨教改项目验收结果

序号	项目类别	项目名称	负责人	所在单位	验收结果	备注
1	一流专业	生态学	章家恩	资源环境学院	验收通过	已入选国家一流专业建设点
2	一流专业	食品质量与安全	孙远明	食品学院	验收通过	已入选国家一流专业建设点
3	一流专业	植物保护	徐汉虹	农学院	验收通过	已入选国家一流专业建设点
4	大学生校外实践教育基地	华南农业大学广东海印股份有限公司实践教学基地	刘辉	公共管理学院	验收通过	
5	大学生校外实践教育基地	华南农业大学上达电子（深圳）股份有限公司实践教学基地	杨卓鸿	材料与能源学院	验收通过	
6	大学生校外实践教育基地	华南农业大学广州博物馆实践教学基地	赵飞	人文与法学学院	暂缓通过	延迟结题
7	大学生校外实践教育基地	华南农业大学索菲亚家居股份有限公司实践教育基地	孙瑾	材料与能源学院	验收通过	
8	大学生校外实践教育基地	华南农业大学通联支付广东分公司实践教学基地	左伟	经济管理学院	验收通过	
9	大学生实践教学基地	华南农业大学广东粤建设计研究院有限公司校外实践教育基地	闫恩诚	水利与土木工程学院	验收通过	
10	实验教学示范中心	工程通识训练实验教学示范中心	陶冶	基础实验与实践训练中心	验收通过	
11	实验教学示范中心	生物质材料与能源实验教学示范中心	胡传双	材料与能源学院	验收通过	
12	实验教学示范中心	工业设计实验教学示范中心	高锐涛	工程学院	验收通过	
13	实验教学示范中心	基于云平台的计算机实验教学示范中心	田绪红	数学与信息学院、软件学院	验收通过	
14	战略新兴产业特色专业	信息与计算科学	蔡贤资	数学与信息学院、软件学院	验收通过	
15	战略新兴产业特色专业	环境设计	郑欣	艺术学院	验收通过	
16	教学团队	制药工程系列实践课程教学团队	倪春林	材料与能源学院	验收通过	
17	教学团队	面向非遗文创的设计学跨专业课程群教学团队	曾智林	艺术学院	验收通过	
18	教学团队	百篇作文教学团队	王瑛	人文与法学学院	验收通过	
19	教学团队	经济管理专业《统计学原理》教学团队	谭莹	经济管理学院	验收通过	
20	教学团队	岭南城乡特色营造实践教学团队	卢丹梅	林学与风景园林学院	验收通过	
21	教学团队	压花艺术教学团队	陈国菊	园艺学院	验收通过	
22	教学团队	国际经济与贸易教学团队	熊启泉	经济管理学院	验收通过	
23	教学团队	刑事法实践教学团队	杜国明	人文与法学学院	验收通过	
24	教学团队	音乐表演专业教学团队	郑颜文	艺术学院	验收通过	
25	在线开放课程	传统园林技艺	高伟	林学与风景园林学院	验收通过	
26	在线开放课程	最优化方法	张昕	数学与信息学院、软件学院	验收通过	

序号	项目类别	项目名称	负责人	所在单位	验收结果	备注
186	教学研究与改革项目	联合教学背景下建筑学三年级快题设计教学改革研究	屈寒飞	水利与土木工程学院	验收通过	
187	教学研究与改革项目	“技能传授+价值引领”的高校军事体育课程体系构建的研究	单宇	体育教学研究部	验收通过	
188	教学研究与改革项目	基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例	刘洋	图书馆	验收通过	
189	教学研究与改革项目	基于翻转课堂的高校图书馆信息素养教育模式研究	关磊	图书馆	验收通过	
190	教学研究与改革项目	“新国标”背景下基于CBI教学理念的高级日语教学模式改革研究	张秀娟	外国语学院	验收通过	
191	教学研究与改革项目	“翻转+对分”混合教学模式研究--以《跨文化交际》课程为例	钟建玲	外国语学院	验收通过	
192	教学研究与改革项目	翻译技术辅助大学英语翻译混合式教学模式有效性研究	李志英	外国语学院	验收通过	
193	教学研究与改革项目	基于农林院校创新型英语人才培养的英语教学模式研究	邓飞	外国语学院	验收通过	
194	教学研究与改革项目	面向“新国标”的日本文学课程改革——混合式教学模式与实践研究	程静	外国语学院	验收通过	
195	教学研究与改革项目	基于移动即时通信工具的混合式教学探究——“雨课堂”在大学英语教学中的应用	吴章欣	外国语学院	验收通过	
196	教学研究与改革项目	基于“翻转课堂”的《大学英语翻译》课程混合式教学创新与实践	周素文	外国语学院	验收通过	
197	教学研究与改革项目	基于信息化建设的本科教学类档案管理模式研究	谢正生	文博馆（档案馆、华南农业博物馆）	暂缓通过	延迟结题
198	教学研究与改革项目	基于素质与专业能力培养的农业大学博物馆展纲构建与教学实践	崔大方	文博馆（档案馆、华南农业博物馆）	验收通过	
199	教学研究与改革项目	“互联网+”翻转课堂的智慧微学习空间建设研究与实践——以华南农业大学为例	江晓庆	信息网络中心	验收通过	
200	教学研究与改革项目	文学影视作品融入《城市广场景观设计》课程的教学研究与实践	戚芳妮	艺术学院	验收通过	
201	教学研究与改革项目	协同教学在服装专业课程中的研究与应用——以服装结构设计课程为例	马宏林	艺术学院	验收通过	
202	教学研究与改革项目	环境设计专业学生创新实践应用能力培养模式的研究与探索	郑欣	艺术学院	验收通过	
203	教学研究与改革项目	依托广东非物质文化遗产构建设计类实践创新课程	陈金怡	艺术学院	验收通过	
204	教学研究与改革项目	服装设计及作品展示虚拟仿真实验教学	赵英姿	艺术学院	已整改通过	
205	教学研究与改革项目	基于可持续发展观培育的环境设计专业实践教学模式创新与研究	吴宗建	艺术学院	验收通过	
206	教学研究与改革项目	线上线下双导式影视动画创作实践教学模式研究	王柯	艺术学院	验收通过	
207	教学研究与改革项目	传统工艺传承与创新教学中的新型学徒关系研究——以香云纱实验教学为例	陆珊	艺术学院	暂缓通过	延迟结题
208	教学研究与改革项目	《城市绿地规划》	邱巧玲	艺术学院	验收通过	
209	教学研究与改革项目	“翻转课堂”在广播电视编导专业教学中的实践与探索	李俊良	艺术学院	验收通过	
210	教学研究与改革项目	基于微课的翻转课堂模式在《茶叶审评与检验》实验教学中的创新与实践	孟慧	园艺学院	已整改通过	
211	教学研究与改革项目	教育国际化背景下日本园艺科学教材中跨学科内容与非文字符号要素的探析与在《设施园艺学》课程中的应用研究	张轶婷	园艺学院	验收通过	

（3）部分申请书

073

项目编号：JG19 072

华南农业大学教育教学研究和改革项目

申 报 书

项目名称 基于交互式在线教育平台应用的混合教学模式探究——以文献检索课为例

项目负责人 刘洋

职 称 馆员

工作单位 图书馆（盖章）

移动电话 15919683294

电子邮箱 liuy@scau.edu.cn

申报日期 2019.06

华南农业大学 教务处 制

2019 年 6 月

1

一、项目及项目负责人、项目组简况

<table>
<tr><td rowspan="3">项目简况</td><td>项目名称</td><td colspan="7">基于交互式在线教育平台应用的混合教学模式探究——以文献检索课为例</td></tr>
<tr><td>项目类别</td><td colspan="7">□1.重点项目　□2.一般项目　√3.青年项目</td></tr>
<tr><td>起止年月</td><td colspan="7">2019.07—2020.09</td></tr>
<tr><td rowspan="8">项目申请人</td><td>姓名</td><td>刘洋</td><td>性别</td><td>女</td><td>出生年月</td><td colspan="2">1989.11</td></tr>
<tr><td>专业技术职务/行政职务</td><td colspan="2">馆员/无</td><td colspan="2">最终学位/授予国家</td><td colspan="2">硕士/英国</td></tr>
<tr><td rowspan="2">所在单位及联系方式</td><td>单位名称</td><td colspan="3">华南农业大学</td><td>手机号码</td><td colspan="2">15919683294</td></tr>
<tr><td>电子邮箱</td><td colspan="6">liuy@scau.edu.cn</td></tr>
<tr><td rowspan="2">主要教学工作简历</td><td>时间</td><td colspan="2">课程名称</td><td>授课对象</td><td colspan="2">学时</td><td>所在单位</td></tr>
<tr><td>2018.09—至今</td><td colspan="2">文献检索</td><td>本科生</td><td colspan="2">32</td><td>图书馆</td></tr>
<tr><td rowspan="2">主要教学改革和科学研究工作简历</td><td>时间</td><td colspan="5">项目名称</td><td>获奖情况</td></tr>
<tr><td></td><td colspan="5"></td><td></td></tr>
<tr><td rowspan="7">项目组</td><td rowspan="2">总人数</td><td colspan="3">职称</td><td colspan="3">学位</td><td></td></tr>
<tr><td>高级</td><td>中级</td><td>初级</td><td>博士后</td><td>博士</td><td>硕士</td><td>参加单位数</td></tr>
<tr><td>5</td><td>2</td><td>3</td><td></td><td></td><td></td><td>5</td><td>1</td></tr>
<tr><td rowspan="5">主要成员（不含申请者）</td><td>姓名</td><td>性别</td><td>出生年月</td><td>职称</td><td>工作单位</td><td>分工</td><td>签名</td></tr>
<tr><td>吴贤奇</td><td>男</td><td>1974.10</td><td>副研究馆员</td><td>图书馆</td><td>负责课程前期设计与教学</td><td></td></tr>
<tr><td>欧群</td><td>女</td><td>1975.07</td><td>副研究馆员</td><td>图书馆</td><td>负责平台资源整合与教学</td><td></td></tr>
<tr><td>刘熙东</td><td>男</td><td>1974.12</td><td>馆员</td><td>图书馆</td><td>负责部分课程内容录制</td><td></td></tr>
<tr><td>何效平</td><td>女</td><td>1974.07</td><td>馆员</td><td>图书馆</td><td>负责部分课程录制和后期数据分析</td><td></td></tr>
</table>

五、经费预算

预算经费总额		4000（元）	
序号	支出科目	预算	支出用途
1	设备费	无	
2	材料费（含打印费、耗材费）	500 元	用于课程问卷调查统计的打印
3	图书资料费	无	
4	软件服务费(含课堂录像及网站制作)	1500 元	用于“微课堂”视频录制软件购买和后期编辑软件
5	交通费	无	
6	差旅费	500 元	用于高校文献检索课的交流出差
7	会议费	无	
8	出版/文献/信息传播/知识产权事务费	1500 元	用于论文的版面费
9	专家咨询费	无	
10	其他费用	无	

六、单位、评审小组及学校意见

所在单位意见：

同意申报。

（公章）

单位负责人签字：

2019 年 6 月 20 日

评审小组意见： 同意立项　评审小组长签字： 2019年　月　日
学校主管部门意见： 同意立项　签章 2019年　月　日

1.2 教学改革论文

1.2.1 Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking (B 类)

SCAULIB202625448

检索证明

根据委托人提供的论文材料，委托人华南农业大学图书馆 刘洋(学科类型:人文社科) 6 篇论文收录情况如下表。

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	Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking	INFORMATION DEVELOPMENT 出版年：2025 出版日期：JUN 2 卷期： 页码： 文献类型：Article, Early Access	第一作者	B 类	华南农业大学图书馆	SSCI	IF2-year=2.1 IF5-year=2.3 (2024)	管理学 4 区 Top 期刊：否 OA 期刊：否 (2025)
2	The Health Risks of Information Avoidance: A RISP Perspective	LIBRI-INTERNATIONAL JOURNAL OF LIBRARIES AND INFORMATION STUDIES 出版年：2025 出版日期：SEP 25 卷期：75 3 页码：219-234 文献类型：Article	第一作者	B 类	华南农业大学图书馆	SSCI	IF2-year=0.8 IF5-year=0.9 (2024)	管理学 4 区 Top 期刊：否 OA 期刊：否 (2025)
3	Global Cassava Germplasm Resources: Industrial and Technological Development	FOOD AND ENERGY SECURITY 出版年：2025 出版日期：SEP 18 卷期：14 5 页码：- 文献号：e70131	共同第一作者	A 类	华南农业大学图书馆	SCI	IF2-year=4.5 IF5-year=5.4 (2024)	农林科学 2 区 Top 期刊：否 OA 期刊：是 (2025)

第 1 页/共 3 页

Check for updates

Original Manuscript

Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking

Information Development
1–18
© The Author(s) 2025
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/02666669251343030
journals.sagepub.com/home/idv
Sage

Yang Liu
Library, South China Agricultural University, Guangzhou, China;
Faculty of Data Science, City University of Macau, Macau, China

Ying-Yueh Su
Department of Textiles and Clothing, College of Textiles and Clothing, Fu Jen Catholic University, New Taipei City

Anas Ali Alhur
Department of Health Informatics, College of Public Health and Health Informatics, University of Hail, Hail, Saudi Arabia

Salman Bin Naeem
Department of Information Management, The Islamia University of Bahawalpur, Bahawalpur, Pakistan

Abstract
Artificial intelligence (AI) literacy plays a significant role in effectively communicating with AI generative chatbots for seeking health information or advice, as well as communicating with healthcare professionals and public health officials. The study aims to identify the factors influencing AI literacy and its subsequent influence on consumers' behavioral intentions toward seeking health information using generative AI chatbots. A nine-factor measurement model (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, AIC) was developed with the help of the Theory of Planned Behavior (TPB) and tested using structural equation modeling. The results of SEM analysis demonstrate that IFO ($\beta = 0.138$, CR = 2.731, $p < .05$), ANX ($\beta = 0.175$, CR = 3.103, $p < .05$), and AVD ($\beta = 0.158$, CR = 3.855, $p < .05$) had a statistically positive significant influence on AI literacy. Similarly, BI ($\beta = 0.128$, CR = 2.423, $p < .05$) had a statistically positive significant influence on AIC. A positive but non-significant effect of INS on AIL was also observed ($\beta = 0.058$, CR = 1.006, $p > .05$). AIL also had a positive but non-significant effect on BI ($\beta = 0.050$, CR = 1.598, $p > .05$). Additionally, the results of model fit indices show adequate model fit values: $\chi 2 = 1.679$ DF = 1867; $p = .000$; IFI = 0.954; TLI = 0.951; CFI = 0.953; RMSEA = 0.031. The findings conclude that information overload, anxiety, and avoidance significantly influence AI literacy. On the other hand, information source exposure, AI hallucination, and information seeking do not significantly influence consumers' AI literacy level. The study suggests that health professionals and staff could be equipped with better knowledge and skills related to AI applications in healthcare settings.

Keywords
artificial intelligence, AI literacy, AI competency, health information, theory of planned behavior, health consumers

Submitted: 2 January 2025; accepted: 2 May 2025

Introduction

Artificial intelligence (AI) is steeping every walk of life and is gradually being used as a tool in various

Corresponding author:
Ying-Yueh Su, Department of Textiles and Clothing, College of Textiles and Clothing, Fu Jen Catholic University, New Taipei City.
Email: 091259@mail.fju.edu.tw

fields and contexts, such as teaching and learning, science and technology, marketing, and healthcare. It adheres to a collection of skills that help an individual to evaluate analytically, collaborate, and communicate efficiently with AI tools and technologies (Chander et al., 2022). It holds incredible potential for improving healthcare services and treatment. It also offers opportunities to rectify physicians' errors and provide guidance to health staff and professionals in providing health services (Lee and Yoon, 2021). Over time, there has been continuous improvement in AI tools and technologies, which has brought substantial revaluation in healthcare settings in the form of reading images, X-rays, and MRI scans; investigating health issues; and developing health safety protocols (Lekadir et al., 2021). Numerous AI-powered applications in healthcare and medicine, such as mental health apps, wearable devices, and telemedicine, allow consumers to assess their health status (Bhatt et al., 2022). It has reformed the healthcare industry by providing parallel options for enhancing the decision-making process, patient management, treatment, and upgrading health infrastructure and research services (Guo and Li, 2018).

AI literacy empowers health consumers, equips health professionals, and enables patients to make informed health decisions about their health management and treatment options (Ai, 2023; Chen and Decary, 2020). It helps them to embrace transformations, identify the key benefits and risks associated with AI innovations, and dynamically contribute to shaping the future of the healthcare industry. AI literacy is becoming an essential competency in transforming how health information is generated, disseminated, and understood. It requires a strong foundation in health information literacy (Ali and Mughari, 2024; Coskun et al., 2024). It encompasses a wide range of literacies to designate a specific technological system, e.g., 'digital literacy,' 'media literacy,' and 'technological literacy,' and the most advanced, 'data literacy' (Bravo et al., 2021; Familoni and Onyebuchi, 2024; Koltay, 2017; Risteska, 2023). Issues of algorithm bias and accountability raise ethical concerns that influence individuals' health behavior when interpreting AI-generated health information from chatbots (Adegboye, 2024). AI literacy empowers individuals to identify and access accurate, trustworthy, and reliable health information from AI models and chatbots (Zhang et al., 2020). AI literacy enhances consumers' health information-seeking behaviors while reducing avoidance of health information and services (Soroya et al., 2024). AI proficiency positively influences health behavior and is associated with improved health decision-making. For example, individuals with higher technological skills experience lower AI anxiety and can more effectively evaluate health information from chatbots (Markus et al., 2024). Moreover, AI literacy helps individuals understand the limitations and biases of AI-generated text and images, enabling them to critically assess health information (Southworth et al., 2023).

Health organizations and departments have acknowledged the significance of AI education programs in primary and secondary healthcare settings that enable consumers to seek health information from generative AI chatbots (Platt et al., 2024). In addition, AI policies have been issued and circulated by the National Artificial Intelligence Initiative Office in the United states in 2021 (Bouanna et al., 2020), in China (Elias, 2021) by the Ministry of Education in 2019, and in Germany (Hälterlein, 2024) by the Federal Ministry of Education and Research. Moreover, there are government-based funded programs in Finland, like 'AI element,' which intend to empower AI proficiency for low-skilled and non-experts consumers (Abetti, 2004). Additionally, several projects have focused on AI education in healthcare for the general population. These initiatives aim to reach individuals from non-technological fields such as social sciences, medical sciences, education, and business administration (Wahl et al., 2018).

Artificial intelligence (AI) is transforming healthcare by enhancing diagnostics, treatment planning, and patient engagement (Lee and Yoon, 2021). However, its efficacy depends on users' ability to critically evaluate AI-generated health information; a competency termed AI literacy (Kajiwara and Kawabata, 2024; Ng et al., 2021). With the rise of generative AI chatbots (e.g., ChatGPT, Gemini) for health information seeking, empirical evidence underscores the urgency of understanding AI literacy's determinants. Studies show that 72% of users struggle to discern accurate health advice from AI chatbots due to algorithmic biases and hallucinations (Wu et al., 2024; Zhang and Kamel Boulos, 2023). Misinterpretations can lead to harmful behaviors, including treatment delays or self-diagnosis errors (Bhatt et al., 2022). Anxiety and information overload reduce trust in AI tools, with 58% of users avoiding

AI-generated health advice despite its accessibility (Markus et al., 2024; Soroya et al., 2024; Zhang and Kamel Boulos, 2023). Such avoidance exacerbates health disparities, particularly among low-literacy populations (Dzangare and Gulu, 2025; Markus et al., 2024). While governments mandate AI education programs, fewer programs target healthcare contexts, leaving consumers unprepared to navigate AI's limitations (Kajiwara and Kawabata, 2024; Platt et al., 2024; Southworth et al., 2023). The present study addresses these gaps by empirically testing a nine-factor model (e.g., information overload, anxiety, avoidance) grounded in the Theory of Planned Behavior (TPB).

The study is significant in terms of improving AI-assisted health-related informed decision-making, enhancing AI literacy and trust among consumers, and informing educational interventions to improve the general health consumer's understanding of AI limitations. Moreover, insights into user behavior can shape ethical guidelines for AI developers and ensure responsible deployment in healthcare contexts. Therefore, the present study is conducted with the following objectives:

Objectives of the study

To measure and validate the Theory of Planned Behavior (TPB) and explore the factors influencing AI literacy and its subsequent influence on consumers' behavioral intention for health information-seeking using AI generative chatbots.

Theoretical framework and development of hypothesis

Several frameworks have been reported in the literature to examine consumers' information behavior. These models or theories include the Comprehensive Model of Information Seeking (CMIS), given by Johnson and Meischke (1993), which is a well-cited framework in the domain of information behavior, particularly health behaviors (Johnson and Meischke, 1993). The CMIS focuses on health information-seeking pathways through its core constructs, i.e., information needs, seeking, and information sources. The Stimulus-Organism-Response (SOR) theory focuses on environmental triggers of behavior through stimuli (e.g., information), emotional/cognitive states, and behavioral responses (Mehrabian and Russell, 1974). The Risk Information Seeking and Processing (RISP) model focuses on how risk motivates information behavior through measuring risk perception and information-seeking behavior. It ignores emotional responses (e.g., information anxiety) (Griffin et al., 1999). The Health Belief Model (HBM) focuses on how individuals perceive and act upon health-related threats. The core constructs of HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Abraham and Sheeran, 2005).

The Theory of Planned Behavior (TPB) has been widely employed to assess consumers' information-related behaviors. It focuses on predicting intention/behavior based on rational appraisal. The TPB posits that behavioral intention is shaped by attitudes toward behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). Previous studies have successfully applied the TPB to understand information-seeking and sharing behaviors (Austvoll-Dahlgren et al., 2012; Feng et al., 2021; Malik et al., 2023; Nguyen et al., 2019). Building on the foundation of previous research studies and addressing the gaps in AI context such as the lack of constructs for AI-specific risks (e.g., hallucinations) and competencies (e.g., AI literacy), the authors have attempted to extend the TPB framework by incorporating constructs, i.e., AI hallucination, information avoidance, and AI literacy under "perceived behavioral control." The framework (Figure 1) also integrates traditional information-related constructs into the TPB's core dimensions, e.g., information seeking and information overload, which were categorized under "attitude toward the behavior." The construct of exposure to information sources was related to the dimension of "subject norms." This adaptation results in a nine-factor measurement model, comprising information seeking, exposure to information sources, information overload, information anxiety, information avoidance, AI hallucination, AI literacy, behavioral intention, and AI chatbot use (as shown in Figure 1, Table 1).

The theoretical framework is significant as it aims to bridge the gap between traditional information-behavior theories (TPB, CMIS, and RISP) and AI-driven health information behaviors by incorporating AI-specific constructs. It systematizes the evolution from traditional information-behavior theories to our AI-adapted framework. While TPB, CMIS, and RISP explain general health information behaviors, they overlook AI-specific phenomena—such as hallucinations (false outputs), literacy gaps, and passive exposure to algorithmic content. By integrating these

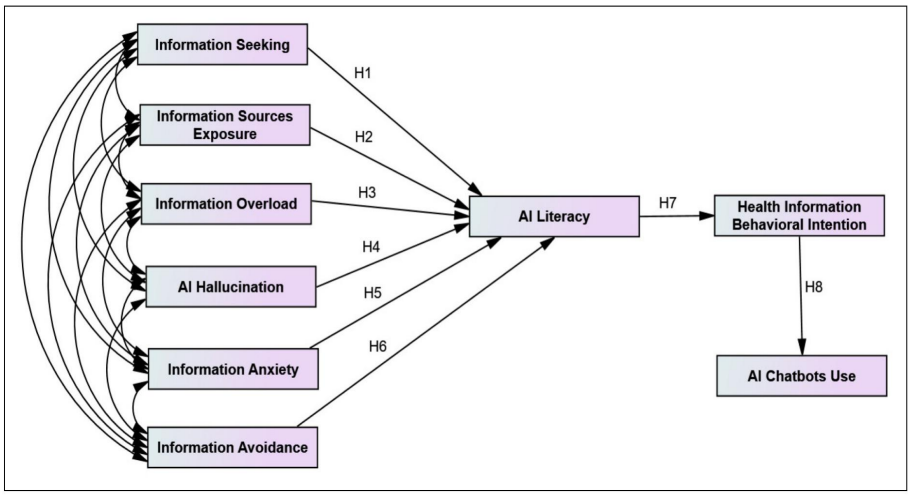


Figure 1. Conceptual framework based on the theory of planned behavior (TPB).

Table 1. Definition of constructs.

Construct	Definition	Example
Health Information Seeking	Active search for health information to address a need or uncertainty.	Health consumers intentionally query an AI chatbot (e.g., "What are the symptoms of diabetes?") to obtain health information.
Health Information Source Exposure	Passive or incidental encounter with health information without actively seeking it.	A chatbot proactively provides health tips or warnings (e.g., "Did you know about flu season risks?") without the user asking.
Information Overload	Feeling overwhelmed by excessive, complex, or conflicting information.	A chatbot provides too much technical information in response to a simple query, making it hard to process.
Information Anxiety	Stress or worry caused by seeking or encountering information.	A user becomes anxious after a chatbot lists severe but rare side effects of a medication they are taking.
Information Avoidance	Deliberate avoidance of information due to fear or discomfort.	A user avoids using a medical chatbot despite having symptoms, fearing a serious diagnosis.
AI Hallucination	AI generates false, misleading, or fabricated information confidently.	A chatbot inaccurately claims a certain herb "cures cancer" when no such evidence exists.

constructs into TPB's dimensions (e.g., AI hallucination as a perceived control barrier), the researchers advance knowledge in terms of AI-driven dimensions (e.g., AI hallucination, AI literacy), which is absent in prior models, addressing how AI's technical flaws alter behavior.

- Seeking vs. Exposure: Seeking is active, while exposure is passive.
- Overload vs. Anxiety: Overload is about information quantity, while anxiety is an emotional response.
- Avoidance vs. Seeking: Avoidance is not engaging with information, while seeking is actively searching.
- AI Hallucination: Unique to AI, where responses are factually incorrect but presented as true.

Information seeking and AI literacy. Health consumers can now easily access necessary information about their health using AI generative tools such as chatbots and virtual assistants. But as their reliance on these tools grows, they must also learn the limitations of

these tools as well as improve their capabilities for using them (Shahsavar and Choudhury, 2023a). AI-generated personalization has provided a strong awareness about AI works and possible assistance (Pataranutaporn et al., 2021). A lot of health-related information is available on the Internet, including information generated by AI tools; users need to verify the information critically. This requires critical skills to analyze the authenticity of sources, categorize preferences, and differentiate between actual and fake information (Cooke, 2017). Understanding the boundaries of health-related AI-generated tools, like predilections in programming or the need to have insights on human errors, encourages the development of critical methods for managing information (Russell et al., 2023). Health consumers use different healthcare applications and platforms to better understand data privacy policies and security concerns. This understanding also empowers ethical considerations when using AI generative tools (Okonji et al., 2024). As a result, AI literacy has a positive correlation with seeking health information from generative AI chatbots. Thus, the researchers proposed the following hypothesis:

H_1. Information seeking is positively correlated with AI literacy level poses by health consumers.

Information sources exposure and AI literacy. Individuals mostly explored health information from AI chatbots and tried to understand exposure to health information sources that may help in raising the awareness of different AI medical apps like diagnosis, cure, and humanized medication (Nadarzynski et al., 2019). People utilize health information sources to gain knowledge about the use of AI generative healthcare applications. This helps them to understand the positive and negative aspects of using these apps, and it also enables them to use these applications in an effective and critical way (Li et al., 2024). People sometimes think critically while using AI healthcare applications because regular use helps them understand the biases and limitations of these AI generative applications (Sai et al., 2024). It also becomes very difficult to build user trust in AI generative tools due to the widespread dissemination of negative and false information about AI generative applications. This is a major threat to AI generative applications because most health consumers are hesitant to rely on these applications for seeking health information due to perceived negative consequences, as well as their low level of AI and health literacy (Berkman et al., 2011; Kang et al., 2023). Therefore, the following hypothesis was formulated:

H_2. Information sources exposure is positively correlated with AI literacy level poses by health consumers.

Information overload and AI literacy. The instant sharing of health information, powered by innovative AI tools, has a significant influence on health consumers' capability to understand the use of healthcare applications of artificial intelligence (Stenzl et al., 2022). AI generative applications provide excessive information about health, and users face difficulties in making decisions regarding their health and whether they should consult these AI apps or not (Shahrzadi et al., 2024). Thus, the information overload presented by the AI tools adds more questions instead of answers, as AI results are also determined by the searching skills of the consumers. This also creates a problem that some consumers rely solely on these applications and find inaccurate information, which may cause health anxiety and serious damage to their health (Stenzl et al., 2024). Misinformation regarding health is likely to mislead health consumers, which is frequently intensified by social media algorithms (Nunziato, 2020). Health consumers possess varying levels of skills in authenticating information. Assessing online information effectively requires advanced digital literacy and analytical skills, which are not uniformly distributed across the population. (Chen et al., 2020). Access to a wide range of health information also increases understanding of the right use of AI generative applications in the medical field (Koski et al., 2022). Thus, the researchers proposed the following hypothesis:

H_3. Information overload is positively correlated with AI literacy level poses by health consumers.

AI hallucination and AI literacy. When it comes to trusting AI-generated tools developed specifically for healthcare, health consumers often hesitate to believe that these tools sometimes provide misinformation regarding health (Demartini et al., 2020). AI hallucinations cause misperceptions and anxiety and might be injurious to health (Hatem et al., 2023). AI generative tools were supposed to be a reliable source for seeking and sharing health information.

As a result, health consumers' consult unauthentic apps instead of healthcare professionals, which can badly damage their health (Shah et al., 2024). Hallucination identifies the boundaries of AI and also requires critical insight. Understanding the hallucination issues faced by consumers can drive the efforts made by research and development to advance AI generative tools to make them trustworthy and authentic. It can contribute in developing AI tools that can be beneficial for both healthcare and the community as a whole (Moulaei et al., 2024). Hallucination is an issue that could be taught to educate health consumers to understand AI, its barriers, and its benefits (Athaluri et al., 2023). Thus, the researchers hypothesized:

H_4. AI hallucination is positively correlated with AI literacy level poses by health consumers.

Health information anxiety and AI literacy. Health information anxiety is defined as the negative feelings and pressure experienced by consumers when they search for health information, especially on the Internet (Schiavo et al., 2024). Conversely, AI-literate users have the capabilities to understand, use, and analyze AI-generative tools and effectively evaluate health information from the flood of information (Zhao et al., 2024). Health consumers with low digital literacy skills or unfamiliar with advanced technologies like AI often experience health information anxiety. This is why they struggle to know critical health issues, via the Internet or without the Internet, which can create hurdles in the advancement of AI proficiency (Duplaga et al., 2024). Those users who do not trust AI-generated text avoid using these healthcare apps, whether these are favorable (Kim et al., 2023). Consequently, this mistrust can lead to health information anxiety, as well as a flood of information on the Internet creating information anxiety among health consumers with low level of AI literacy (Lund et al., 2024). Thus, the researchers hypothesized:

H_5. Information anxiety is positively correlated with AI literacy level poses by health consumers.

Health information avoidance and AI literacy. Health information avoidance can be defined as the active or passive behavior of trying to prevent or delay exposure to health-related information, even when that information might be relevant to one's health (Jia and Li, 2024; Wang et al., 2024b). Information avoidance is the opposite of information seeking. This can be due to fear, a feeling of being overwhelmed, or a lack of trust in information sources. (Jia and Li, 2024). Information avoidance can be a coping mechanism in response to information anxiety. It can also take place due to the low level of consumers trust in AI tools. Low AI literacy might also contribute to avoidance of AI-generated health information (Abdulateef et al., 2021). The direct influence of health information avoidance is yet unclear; the indirect associations suggest that health information avoidance is experienced by low attention to AI proficiency among certain populations (Jia and Li, 2024; Ko et al., 2023). Health information avoidance can be decreased by motivating health consumers to develop advanced technological skills to access up-to-date information and become AI literate so that they can use AI tools with confidence (Cheng and Peng, 2024). Thus, the researchers proposed the following hypothesis:

H_6. Information avoidance is positively correlated with AI literacy level among health consumers.

AI literacy and health information behavioral intention. AI literacy skills enable health consumers to determine the reliability and validity of health information. AI literacy empowers health consumers to differentiate real information from misinformation. It also decreases the chances of getting caught in the clutches of AI tools (Wang et al., 2024a). Health consumers can also make decisions according to their current health conditions when they understand the limitations and potential biases of AI-generated apps (Crook et al., 2016). AI literacy also enhances the trust of health consumers to use AI-generated apps such as symptom checkers, virtual health assistants, and personal healthcare apps (Shahsavar and Choudhury, 2023b). AI-literate health consumers find AI tools very helpful. This leads to high adoption and utilization of AI tools, and it can improve health outcomes (Chew and Achananuparp, 2022). Therefore, the following hypothesis was formulated:

H_7. AI literacy significantly influence health information behavioral intention among health consumers for health information seeking.

AI literacy and AI chatbot use. With the help of AI chatbots, individuals encounter personalized learning

according to their needs. They also propose instant suggestions and recommendations for better improvement so other health consumers can understand easily (Kajiwara and Kawabata, 2024). AI-literate feel AI chatbots are helpful, as they complete their critical tasks within no time (Ng et al., 2021). Moreover, AI chatbots provide fast and reliable health information, which saves time and energy. AI-literate consumers also use AI-generated apps to reorganize their workload and complete work with greater proficiency (Nadarzynski et al., 2019). AI chatbots can analyze a lot of data and can guide consumers to make valuable decisions accordingly (Alaaeldin et al., 2021). Another benefit of AI chatbots is that they provide information in numerous languages to control language hurdles (Mohan et al., 2023). AI chatbots also facilitate disabled persons by the provision of healthcare (Huq et al., 2024). The following hypothesis was formulated:

H_8. Health information behavioral intention significantly influence on generative AI Chatbots adoption and use among health consumers.

Research methodology

A cross-sectional survey was conducted among health consumers (general public) in the Muzaffarabad division of Azad Jammu & Kashmir (AJ&K), Pakistan. AJ&K comprises three administrative divisions (Muzaffarabad, Mirpur, Poonch), with Muzaffarabad division further divided into three districts: Muzaffarabad, Neelum Valley, and Jhelum Valley. The target population included adults (aged ≥ 18 years) who were either using AI chatbots (e.g., ChatGPT, Gemini), or at least recognized, in the region for health information seeking.

Research setting

The study was conducted in the Muzaffarabad division of Azad Jammu & Kashmir (AJ&K), Pakistan, a region with unique socio-demographic, technological, and healthcare characteristics that make it an insightful setting for investigating factors influencing AI literacy for health information seeking. The study's focus on the Muzaffarabad division (comprising urban, peri-urban, and remote districts like Neelum Valley) ensures diverse insights across different factors and AI literacy levels. Despite being a semi-autonomous region with geographical challenges, AJ&K has seen rapid growth in Internet and smartphone usage in recent years (with 4G coverage expanding to 70% of the region as of 2023) (Authority, 2024), creating a fertile ground for digital health tools. The younger population (particularly in urban centers like Muzaffarabad city) is increasingly tech-savvy, with exposure to AI-driven tools such as ChatGPT, Gemini, and other generative AI chatbots through social media and educational platforms. Preliminary surveys and local digital literacy reports indicate that AI-based health information seeking is emerging, especially among consumers seeking alternatives to limited healthcare resources (Hamid and Tahir, 2023). Moreover, AJ&K faces healthcare accessibility challenges due to its mountainous terrain and limited specialist facilities, prompting residents to rely on digital health tools for preliminary medical advice (Shen et al., 2024). The adoption of AI chatbots for health queries aligns with global trends but remains understudied in rural and semi-urban Pakistani contexts, making this region a valuable case study. Findings from AJ&K can inform AI literacy initiatives in similar low-resource settings where digital health tools are increasingly used but formal health infrastructure is underdeveloped. Moreover, there exist limited studies that have assessed factors influencing AI literacy for health in AJ&K, despite its unique position as a conflict-affected region with escalating digital reliance. By selecting AJ&K, this study captures an underrepresented yet digitally evolving population, contributing to the global discourse on AI literacy while addressing region-specific healthcare information-seeking behaviors.

Data collection tool

The data collection tool was developed after reviewing the relevant available literature (Familoni and Onyebuchi, 2024; Hatem et al., 2023; Ivanov et al., 2024; Ng et al., 2021; Shamlou et al., 2022) and also assessing information-seeking behavior of health consumers using AI chatbots. The questionnaire was based on two sections. The first section consists of demographic information of participants which includes; gender, age, education level, living status, and living setting. Section two contains sub-scale involving nine constructs based on the Theory of Planned behavior (TPB). These constructs are: information seeking (INS), information sources exposure (ISE), information overload (IFO), AI hallucination (AIH), information anxiety (ANX), information

Table 2. Cronbach's alpha coefficients value.

Sr. No	Constructs	No. of items	Cronbach's Alpha
1	Information Seeking (INS)	8	0.804
2	Information Source Exposure (ISE)	7	0.903
3	Information Overload (IFO)	7	0.814
4	AI hallucination (AIH)	7	0.881
5	Information Anxiety (ANX)	6	0.802
6	Information Avoidance (AVD)	6	0.881
7	Artificial Intelligence literacy (AIL)	7	0.910
8	Health Information Behavioral Intention (BI)	8	0.837
9	AI Chatbots Use (AIC)	7	0.867

avoidance (AVD), AI literacy (AIL), behavioral intention (BI) and AI chatbots use (AIC). The constructs ANX and AVD consist of six items, ISE, IFO, AIH, AIL and AIC contains seven statements, and the constructs INS and BI entail eight items. Overall, questionnaire holds nine constructs and 63 statements.

Validity and reliability measurements. The validity of a questionnaire was evaluated by two experts from the fields of AI and information science. The suggested changes that were incorporated as a result of experts' review were related to increasing the clarity of the items. This update carries a reorganization of a few statements and phrases to enhance readability and improve sequence. The first 30 responses were used to conduct pilot testing of the questionnaire. To determine the questionnaire's reliability, the SPSS Cronbach's Alpha test was used. This test generated a value of 0.930 for the 63 statements under nine constructs, indicating good reliability for the questionnaire. The score of Cronbach's alpha coefficients for each construct measured in this study is given in Table 2.

The measurement model demonstrates (Table 3) that all constructs show excellent Composite Reliability (CR) (0.874–0.892), well above the 0.7 threshold. The average variance extracted (AVE) values (0.483–0.551) meet the 0.5 benchmark, indicating adequate convergent validity. Maximum Shared Variance (MSV) values (0.164–0.40) are below corresponding AVEs, supporting discriminant validity. Maximum Reliability (MaxR(H)) values (0.904–0.917) confirm strong construct reliability. The correlation analysis indicates that most correlations are significant at $p < .001$ (***) or $p < .01$ (**). The strongest relationship exists between AIH (AI Hallucination) and ANX (Anxiety) (0.635***). INS (Information Seeking) also show strong correlation with ISE (Information Source Exposure) (0.567***).

Univariate and multivariate normality assessment. The normality estimation is a key part of SEM analysis; otherwise, it can compromise 'parameter estimates,' 'standard errors,' and 'hypotheses testing.' To measure normality, we calculated skewness and kurtosis by using the 'maximum likelihood estimation' (MLE) method. All variables meet the desired conditions for skewness (< 3) (Kline, 2023), kurtosis (< 7), and multivariate kurtosis (< 5) (Yuan et al., 2005), requiring reasonably symmetry and observance to univariate and multivariate normality criteria (West et al., 1995). Outliers were identified and discarded using Mahalanobis d-squared method.

Data collection process

Data were collected from September to November 2024 through both printed (face-to-face) surveys and online (Google Form) surveys. Printed questionnaires were distributed across public spaces (hospitals, community centers) in Muzaffarabad, Neelum Valley, and Jhelum Valley. An online survey (Google Form) was shared via online local health forums, community networks, and social media groups within the Muzaffarabad division. The mixed-mode survey approach is well-supported in global health research and tailored to the region's constraints (Coffey et al., 2024). Online survey reduced exclusion bias in low-resource settings, as well as reduced expenses for remote areas where travel was challenging (e.g., mountainous Neelum Valley). Moreover, parallel data collection accelerated recruitment (completed in 3 months).

Sample size calculation and sampling strategy. A purposive sampling technique was employed to recruit participants who met the inclusion criteria: (i) residents of AJ&K's Muzaffarabad division, (ii) active users of digital health tools or AI chatbots, and (iii) willingness to provide informed consent. The purposive sampling technique was chosen for this study due

Table 3. Model validity measures.

Constructs	CR	AVE	MSV	MaxR(H)	INS	ISE	AVD	AIH	IFO	ANX
INS	0.883	0.483	0.321	0.905						
ISE	0.874	0.501	0.321	0.904	0.567***					
AVD	0.887	0.551	0.165	0.915	0.162***	0.119**				
AIH	0.881	0.521	0.403	0.912	0.144***	0.230***	0.336***			
IFO	0.892	0.532	0.164	0.917	0.122**	0.226***	0.241***	0.405***		
ANX	0.882	0.538	0.403	0.911	0.119**	0.193***	0.406***	0.635***	0.379***	

$p < .001$ (***), $p < .01$ (**), $p < .05$ (*).

to its methodological and contextual reasons. For example, the study focuses on AI chatbot users for health information seeking, a relatively niche group in AJ&K, where AI adoption is emerging but not yet widespread. Thus, purposive sampling ensures recruitment of participants who actively meet the inclusion criteria (e.g., prior use of ChatGPT/Gemini for health queries), avoiding the inefficiency of random sampling, which might yield too few qualified respondents. But purposive sampling allows deliberate selection of information-rich cases, ensuring participants can meaningfully contribute. Moreover, purposive sampling enables targeted outreach via digital channels (social media, local community networks) to reach tech-savvy users, as well as identifying individuals using AI chatbots for information seeking in local health and community centers. Using G*Power 3.1 with an effect size of 0.3 (moderate), power of 0.95 (conventionally, > 0.80) (Cohen, 1988), and alpha = 0.05, the minimum required sample size was 400 for structural equation modeling (Soper, 2020). To enhance statistical robustness and generalizability while minimizing sampling error, we distributed 1000 questionnaires (both printed and online via Google Forms), obtaining 715 valid responses (71.5% response rate) after excluding incomplete responses (n = 30).

Data analysis procedure

Data analysis was carried out by using 'Statistical Package for Social Sciences' (SPSS) software version 26. Using Chi-Square tests, we examined the differences in respondents' gender distribution across categorical variables including age, education level, field of study, living status, and living settings. A nine-factor measurement model (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, AIC) was developed based on the Theory of Planned Behavior (TPB) (Figure 1) and tested using the structural equation modeling (SEM). Subsequently, SEM was employed to validate the proposed hypotheses. The significance threshold was set at $p < .05$ for all analyses.

Ethical approval

The study was accompanied by the endorsement of the 'Departmental Research Committee' (DRC) of the Department of Information Management at the 'Islamia University of Bahawalpur', Pakistan. It adhered to research ethics by ensuring consensus from all study subjects. The study's subjects were volunteers who could opt out at any time.

Findings

Demographic information

Of the 715 participants, the majority 449 (62.8%) were females and 266 (37.2%) were males. Using Chi-square, we found a statistically non-significant difference in the distribution of females and males across different age groups ($\chi^2 = 1.523$, $p = .467$, phi's value = .046). However, a statistically significant difference was found in the education level of male and female participants ($\chi^2 = 6.403$, $p = .041$, phi's value = .095). There were 41.6% postgraduate females as compared to 32.3% males. Moreover, a non-significant difference was assessed between respondents' fields of study ($\chi^2 = 4.279$, $p = .0233$, phi's value = .077). Furthermore, there were no significant differences found in the distribution of living status of gender ($\chi^2 = 0.030$, $p = .862$, phi's value = .006), and living setting-wise distribution in rural and urban areas ($\chi^2 = 0.595$, $p = .743$, phi's value = .029) (Table 4).

Structural equation modeling (SEM)

SEM was applied to test the proposed conceptual framework in Figure 1, confirming the validity of

Table 4. Demographic information of the respondents.

Health Consumers	Male	Female	χ2 Value	p-Value	Phi/ Cramer's V
Age					
Less than 20 years	18 (6.8%)	26 (5.8%)	1.523	0.467	.046
21–25 years	166 (62.4%)	265 (59%)			
More than 25 years	82 (30.8%)	158 (35.2%)			
Total	266 (37.2%)	449 (62.8%)			
Education Level					
Undergraduate	22 (8.3%)	28 (6.2%)	6.403	0.041	.095
Graduate	158 (59.4%)	234 (52.1%)			
Postgraduate	86 (32.3%)	187 (41.6%)			
Total	266 (37.2%)	449 (62.8%)			
Discipline					
Sciences	76 (28.6%)	101 (22.5%)	4.279	0.233	.077
Social Sciences	106 (39.8%)	207 (46.1%)			
Arts and Humanities	72 (27.1%)	117 (26.1%)			
Other	12 (4.5)	24 (5.3)			
Total	266 (37.2%)	449 (62.8%)			
Living Status					
Living Alone	56 (21.1%)	97 (21.6%)	0.030	0.862	.006
Living with the Family	210 (37.4%)	352 (62.6%)			
Total	266 (37.2%)	449 (62.7%)			
Living Setting					
Rural	113 (37.2%)	197 (62.8%)	0.595	0.743	.029
Urban	150 (36.5%)	255 (63.5%)			
Total	266 (37.2%)	449 (62.8%)			

hypotheses and identifying the factors influencing AI literacy and its impact on health behavioral intention.

Standardized estimation of regression weights. The standardized estimation of regression weights for the loadings of the latent constructs is shown in (Figure 2). The loading values of the constructs (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, and AIC) were diverse, ranging between $\beta = 0.57$ and $\beta = 0.83$, showing the acceptable validity of the estimated constructs. The latent variables ANX and AVD consist of six observable variables each, and their loading values range between $\beta = 0.75$ and $\beta = 0.83$, which indicates good loadings on the constructs. Similarly, the latent variables ISE, IFO, AIH, AIL, and AIC contain seven statements each, and their loading values range between $\beta = 0.75$ and $\beta = 0.81$, exhibiting good loadings on the constructs. Whereas the loading values of INS and BI consist of eight items each, ranging between $\beta = 0.63$ and $\beta = 0.80$, demonstrating good loadings on the constructs.

The estimation of path coefficient values determined that INS ($\beta = 0.05$), IFO ($\beta = 0.12$), ANX ($\beta = 0.18$), AVD ($\beta = 0.17$) positively correlated with AIL (as shown in H_1, H_3, H_5, H_6). On the other hand, ISE ($\beta = -.03$), AIH ($\beta = -.08$) negatively correlate with AIL (as shown in H_2, H_4). However, AIL ($\beta = 0.07$) had a positive influence on BI (as shown in H_7). Similarly, BI ($\beta = 0.10$) also had a positive influence on AIC (as shown in H_8) (Figure 2).

Standardized estimation of correlation among latent variables. The measurement of standardized correlations among latent variables is shown in Figure 2. The latent variables INS, ISE, IFO, AIH, ANX, and AVD had weak to strong correlations ($\beta = 0.23$ to $\beta = 0.63$) with each other. Similarly, INS and IFO ($\beta = 0.12$), ISE and AIH ($\beta = 0.23$), IFO and ANX ($\beta = 0.38$), AIH and AVD ($\beta = 0.34$) had weak to moderate correlations. Moreover, INS and AIH ($\beta = 0.14$), ISE and ANX ($\beta = 0.19$), IFO and AVD ($\beta = 0.24$) had a weak correlation. Likewise, INS and ANX ($\beta = 0.12$), ISE and AVD ($\beta = 0.12$) also had weak correlations with each other. Furthermore, INS and AVD ($\beta = 0.16$) were weakly associated with each other.

Standardized estimation of regression weights and validation of hypotheses. Table 5 shows the

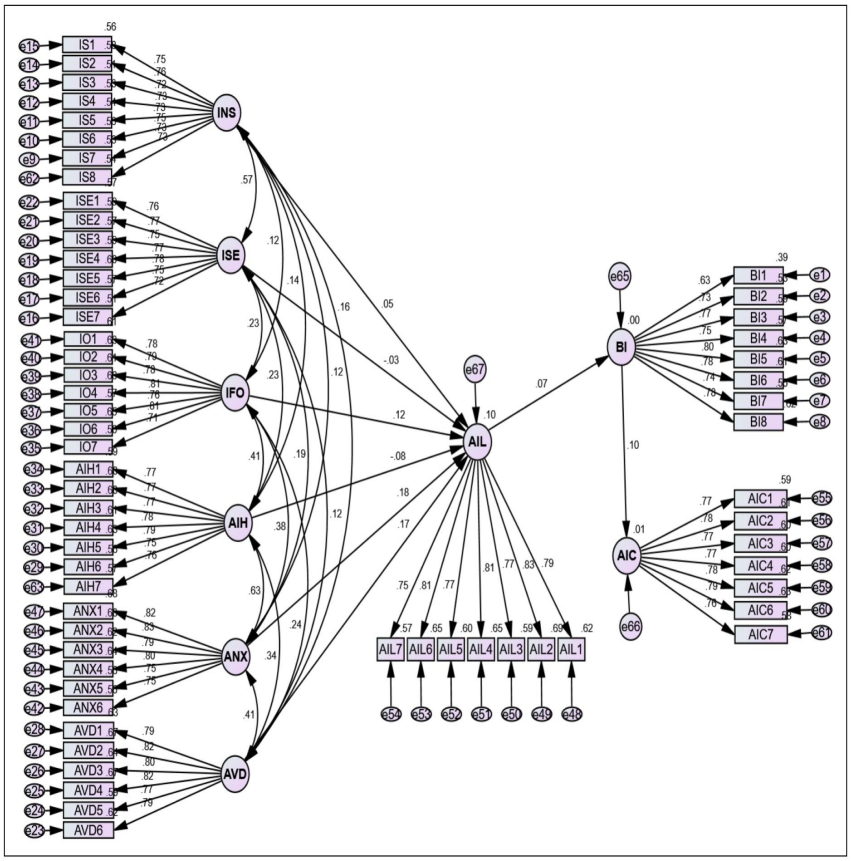


Figure 2. Measuring the constructs of structural equation modeling (SEM). Constructs: Information Seeking (INS), Information Sources exposure (ISE), Information Overload (IFO), AI Hallucination (AIH), Information Anxiety (ANX), Information Avoidance (AVD), AI Literacy (AIL), Health behavioral Intention (BI), and AI Chatbots Use (AIC).

standardized estimation of regression, the standard error (SE) for the estimation of constructs, the critical ratio (CR), the level of significance, and the validation of proposed hypotheses. Regression analysis is a measurement that empowers the researcher to gauge the differences between constructs. The notation (***) indicates a statistically significant result at the 0.001 level.

The results of SEM analysis demonstrate that IFO ($\beta = 0.138$, $CR = 2.731$, $p < .05$), ANX ($\beta = 0.175$, $CR = 3.103$, $p < .05$), and AVD ($\beta = 0.158$, $CR = 3.855$, $p < .05$) had a statistically positive significant influence on AIL. Similarly, BI ($\beta = 0.128$, $CR = 2.423$, $p < .05$) had a statistically positive significant influence on AIC. A positive but non-significant effect of INS on AIL was also observed ($\beta = 0.058$, $CR = 1.006$, $p > .05$). AIL also had a positive but non-significant effect on BI ($\beta = 0.050$, $CR = 1.598$, $p > .05$). Conversely, ISE ($\beta = -0.040$, $CR = -0.657$, $p > .05$), and AIH ($\beta = -0.079$, $CR = -1.376$, $p > .05$) had a negative non-significant influence on AIL.

Squared multiple correlations. The results of squared multiple correlations demonstrated that AI literacy caused 10% of variance in the relationship between INS, ISE, IFO, AIH, ANX, AVD, and BI (Figure 2).

Model fit indices. The goodness values of model fit, as shown in Table 6, indicate that the proposed model is acceptable.

Discussion

This study aims to measure and validate the Theory of Planned Behavior (TPB) and identify the factors

Table 5. Validation of the hypotheses.

	Factor	Estimate	S.E	C.R	p-Value	Result
H_1	INS—> AIL	.058	.057	1.006	.314	Rejected
H_2	ISE—> AIL	−.040	.061	−.657	.511	Rejected
H_3	IFO—> AIL	.138	.050	2.731	.006	Accepted
H_4	AIH—>AIL	−.079	.057	−1.376	.169	Rejected
H_5	ANX—>AIL	.175	.056	3.103	.002	Accepted
H_6	AVD—>AIL	.158	.041	3.855	***	Accepted
H_7	AIL—>BI	.050	.031	1.598	.110	Rejected
H_8	BI—> AIC	.128	.053	2.423	.015	Accepted

Table 6. The goodness of model fit indices values.

Model fit indices	$\chi 2$	DF	IFI	TLI	CFI	RMSEA
Acceptable fit	$\chi 2 \leq 3$	DF	IFI $\geq .90$	TLI $\geq .90$	CFI $\geq .90$	RMSEA $\leq .08$
Model fit values	1.679	1867	0.954	0.951	0.953	0.031

influencing AI literacy and its subsequent influence on consumers' health behavior towards seeking health information from using generative AI chatbots. Eight hypotheses were developed to assess the relationship between the TPB constructs and AI literacy. The result of the structural equation modeling (SEM) analysis proved that out of eight hypotheses, four were accepted (as shown in Table 7).

The findings of our study support the findings of previous studies (Shahrzadi et al., 2024; Stenzl et al., 2024) that information overload has a statistically significant positive influence on AI literacy. These findings showed that good knowledge of AI skills could help evaluate health information across various AI models or chatbots to make informed health decisions (Nadarzynski et al., 2019; Shen et al., 2024; Wang et al., 2024b). Similarly, the findings of our study are consistent with the findings of prior research (Cheng and Peng, 2024; Crook et al., 2016; Duplaga et al., 2024), showing that information anxiety and information avoidance have a statistically significant positive influence on AI literacy. This indicates that sound knowledge of AI literacy skills can change consumers' perception about innovative technology, increase information-seeking behavior, and decrease avoidance behavior. Moreover, our study findings are aligned with the findings of studies (Chen and Decary, 2020; Chew and Achananuparp, 2022; Shahsavar and Choudhury, 2023a), that health information behavioral intention has a statistically positive significant influence on AI chatbots. This finding suggests that individuals with higher levels of AI literacy skills are more likely to rely on AI chatbots to seek healthcare for self-diagnosis than those with low AI skills (Kimiafar et al., 2023).

Alternatively, the findings of our study are comparable with the results of past research (Platt et al., 2024; Soroya et al., 2024) that information seeking has a statistically positive but non-significant influence on AI literacy. These findings demonstrate that to share more information and raise awareness among consumers about AI systems, we can advance AI literacy. Similarly, our findings are consistent with previous research findings (Esmaeilzadeh, 2020; Familoni and Onyebuchi, 2024) that AI literacy has a positive but non-significant influence on health information behavioral intention. This suggests that improved AI literacy skills could have a potential effect on an individual's capability to understand, search for, and use health information competently and effectively.

On the other hand, the findings of our study negate the findings of past studies (Agarwal et al., 2024; Brown and Halpern, 2021; Burns et al., 2024), that health information source exposure and AI hallucination have a statistically negative but non-significant influence on AI literacy. This indicates that overexposure and hallucinated health information generated by AI chatbots or models can be countered by improving consumers' skills in AI literacy. Specifically, health consumers with higher AI literacy are better equipped to recognize the limitations of AI and critically evaluate health information-generative by AI tools, thereby reducing the risks posed by AI hallucinations (Ali and Mughari, 2024).

Table 7. Summary of key findings.

Variable	Influenced by	Effect size (β)	Critical ratio (CR)	p-value
AI Literacy (AIL)	Information Overload (IFO)	0.138	2.731	< .05
AI Literacy (AIL)	Information Anxiety (ANX)	0.175	3.103	< .05
AI Literacy (AIL)	Information Avoidance (AVD)	0.158	3.855	< .05
AI Chatbots Use (AIC)	Behavioral Intention (BI)	0.128	2.423	< .05

IFO → AIL (β = 0.138), ANX → AIL (β = 0.175), AVD → AIL (β = 0.58), BI → AIC (β = 0.128).

Implications of the study

Building on these insights, our study extends the Theory of Planned Behavior (TPB) by incorporating novel variables, i.e., information seeking, information source exposure, information overload, and AI hallucination, to better understand health consumers' health information-related decision-making in the age of generative AI. The study's findings emphasize that AI literacy is a shared responsibility in which healthcare professionals should guide safe AI generative tool adoption, health consumers need skills to navigate AI-generated health information critically, and institutions should provide infrastructure for oversight.

The study highlights the need to develop AI literacy among health consumers. It suggests a need to actively engage with emerging AI technologies and their applications in healthcare. It suggests organizing targeted workshops, seminars, and research initiatives that could educate consumers about the capabilities and limitations of AI generative tools. Moreover, professional education and training are essential for developing the analytical skills needed to assess health information from AI-driven sources (Alkurdi et al., 2024). Therefore, it is suggested that health organizations and departments should offer specialized training programs on AI literacy, involving seminars, workshops, and online courses on using generative AI and its applications for health information seeking and health-related decisions. Healthcare professionals can develop guardrails for high-risk scenarios and can educate patients on safe AI use.

This study highlights the potential of AI in advancing consumers' critical skills and contributes to a deeper understanding of the field. It might be helpful to make informed health decisions, especially in the evolving area of clinical research and digital healthcare. Health professionals are motivated to take initiative and adopt policies and to keep up-to-date about the current developments in AI through continuous professional education improvement, training on AI technologies, and encouragement to promote interdisciplinary research collaboration that enhances AI literacy, which ultimately changes consumers' intention toward seeking healthcare from AI chatbots or software.

Furthermore, this study also identifies the need for understanding cultural and contextual background and highlights the problems confronted by health consumers and requirements for specific AI frameworks grounded in the local perspective. To implement and integrate AI in healthcare, infrastructure limitations, regulatory features, and effective strategies must be acknowledged. However, periodically evaluating scalability, repair needs, and usability will ensure benefits and mitigate potential problems that may arise after the adoption of AI generative tools. Health consumers and professionals are encouraged to adopt AI in healthcare settings, more analysis of AI expertise, cultural variations, consumers' understandings, experiences, and long-lasting sustainability is vital.

Limitations of the study

The present study is structured on respondents' self-reported data, which was collected through a cross-sectional research design accompanied by various biases, such as response bias, methodological bias, low level of knowledge, understanding of the questionnaire's statements, etc. Despite the inherent limitations of survey research, we have implemented several strategies to mitigate these issues. Two experts, for example, pre-tested and assessed the questionnaire, and 30 responses were used for pilot testing. The questionnaire's reliability was ensured using Cronbach's Alpha. All participants were provided with pre-survey explanations of questionnaire items and ongoing support for any clarification needs during the study. Moreover, the composite reliability, convergent validity, discriminant validity, and construct reliability of the model were also measured and ensured. The data collected was also checked for normality and outliers before analysis. While self-report data has limitations

for measuring complex constructs like AI literacy, it remains the most feasible method for capturing users' subjective experiences and intentions at scale. Moreover, our study examined psychological constructs (perceptions, intentions, anxiety) that are inherently subjective and best captured through self-report. Future research could acknowledge these limitations by adopting an experimental research design. We included health consumers (the general public) as a sample of our study from the state of Azad Jammu and Kashmir (AJ&K) only from divisions of Muzaffarabad districts (Muzaffarabad, Neelum Valley, and Jhelum valley). Further research studies may expand their sample size by the inclusion of two other divisions, i.e., the Mirpur division (Mirpur, Kotli, and Bimber) and the Poonch division (Rawalakot, Bagh, and Sudhnoti). We selected six predictors that influence AI literacy in our study's proposed framework based on the Theory of Planned Behavior (TPB) (Figure 1). However, exploring some additional relevant predictors of AI literacy, i.e., privacy and security of research data, user trust, and authenticity of information sources, could offer valuable insights. We did not acknowledge the respondents' geographical settings and healthcare infrastructure. This would also affect the generalizability of our study findings. Finally, we did not examine the moderating influence of respondents' age, gender, and qualification level to see the difference, if any, in their AI literacy skills.

Conclusion

Our study confirms the validity of the Theory of Planned Behavior (TPB) framework in examining the factors influencing AI literacy among health consumers and its influence on behavioral intention to seek health information using generative AI chatbots. The study results identified that information overload, anxiety, and avoidance are the significant factors influencing AI literacy levels. While information source exposure, AI hallucinations, and information seeking are the non-significant factors influencing AI literacy levels among health consumers. Furthermore, this study suggests that a comprehensive framework on AI literacy could be introduced that could help in equipping health professionals with the knowledge and competency to raise awareness regarding AI tools as well as to promote AI literacy among healthcare consumers. Libraries can be very instrumental in organizing training sessions on AI literacy and developing AI literacy instruction programs. Our study suggests that further research is needed to explore the impact of AI literacy on the changing healthcare landscape. It suggests developing mechanisms for assimilating AI literacy with health literacy to assess consumers' health behavior. It also suggests addressing the evolving challenges of AI-mediated health information seeking. Moreover, future studies should also focus on developing strategies and interventions to improve AI literacy skills among different population groups such as patients with chronic diseases, students, and the general public. Additionally, empirical comparative studies are needed to evaluate AI literacy across different healthcare settings and demographic contexts.

Acknowledgement

This paper was supported by Guangdong Provincial library Research Project: Construction of a Performance Evaluation System for University Library Information Services (GDTK23030) and the Chinese Association of Agricultural Science Societies. Construction of a Dual-Chain Integrated Model for Cultivating Innovative Talents in Agricultural Intellectual Property (PCE2234).

Declaration of conflicting interests

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

Data availability statement

Informed consent was obtained from all questionnaire respondents.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed consent statement

Informed consent was obtained from all questionnaire respondents.

Institutional review board statement

The study was approved by the Departmental Research Committee (DRC), Department of Information Management, The Islamia University of Bahawalpur, Pakistan under approval code 8-2024/DoIM.

No personally identifiable information was collected from questionnaire respondents. Participation consents were obtained in verbal or written from each individual participant in the study.

ORCID iD

Salman Bin Naeem https://orcid.org/0000-0003-4335-8080

References

Abdulateef AA, Mohammed AH and Abdulateef IA (2021) The avoidance and detection function of artificial intelligence in COVID-19. In: *2021 3rd International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)*, pp.1–7: IEEE.

Abetti PA (2004) Government-supported incubators in the Helsinki region, Finland: Infrastructure, results, and best practices. *The Journal of Technology Transfer* 29(1): 19–40.

Abraham C and Sheeran P (2005) The health belief model. *Predicting Health Behaviour* 2(1): 28–80.

Adegboye M (2024) Impact of artificial intelligence on health information literacy: guidance for healthcare professionals. *Library Hi Tech News* 41(7): –4.

Agarwal V, Jin Y, Chandra M, et al. (2024) MedHalu: Hallucinations in responses to healthcare queries by large language models. *arXiv preprint arXiv:2409.19492*.

Ai W (2023) *Integrating Design Literacy Within Chinese Health Promoting Hospitals*. London, UK: Royal College of Art.

Ajzen I (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50(2): 179–211.

Alaaeldin R, Asfoura E, Kassem G, et al. (2021) Developing chatbot system to support decision making based on big data analytics. *Journal of Management Information and Decision Sciences* 24(2): 1–15.

Ali MA and Mughari S (2024) Effect of AI literacy on online information search competencies among medical students in Pakistan. *Information Development*: 02666669241299765. https://doi.org/10.1177/02666669241299765.

Alkurdi D, Rasouli S and Jia B (2024) The role of artificial intelligence in modern medical education and practice: A systematic literature review. *MedRxiv*. https://doi.org/10.1101/2024.07.25.24311022.

Athaluri SA, Manthena SV, Kesapragada VKM, et al. (2023) Exploring the boundaries of reality: investigating the phenomenon of artificial intelligence hallucination in scientific writing through ChatGPT references. *Cureus* 15(4): e37432. https://doi.org/10.7759/cureus.37432.

Austvoll-Dahlgren A, Falk RS and Helseth S (2012) Cognitive factors predicting intentions to search for health information: An application of the theory of planned behaviour. *Health Information & Libraries Journal* 29(4): 296–308.

Authority PT (2024) Pakistan Telecommunication Authority Annual Report 2023. Reportno. Report Numberl, Date. Place Publishedl: Institutionl.

Berkman ND, Sheridan SL, Donahue KE, et al. (2011) Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine* 155(2): 97–107.

Bhatt P, Liu J, Gong Y, et al. (2022) Emerging artificial intelligence–empowered mhealth: Scoping review. *JMIR mHealth and UHealth* 10(6): e35053.

Bouanna J, Diaz-Valdes G, Frizzell L, et al. (2020) *The World Wide Race for Artificial Intelligence: A Path Forward for US Policy*. Washington: University of Washington.

Bravo MCM, Chalezquer CS and Serrano-Puche J (2021) Meta-framework of digital literacy: A comparative analysis of 21st-century skills frameworks. *Revista Latina de Comunicacion Social* (79): 76–109. https://doi:10.4185/RLCS-2021-1508.

Brown JE and Halpern J (2021) AI Chatbots cannot replace human interactions in the pursuit of more inclusive mental healthcare. *SSM-Mental Health* 1: 100017.

Burns B, Nemelka B and Arora A (2024) Practical implementation of generative artificial intelligence systems in healthcare: A United States perspective. *Future Healthcare Journal* 11(3): 100166.

Chander B, Pal S, De D, et al. (2022) *Artificial Intelligence-Based Internet of Things for Industry 5.0*. Cham.: Springer.

Chen IY, Joshi S and Ghassemi M (2020) Treating health disparities with artificial intelligence. *Nature Medicine* 26(1): 16–17.

Chen M and Decary M (2020) Artificial intelligence in healthcare: An essential guide for health leaders. *Healthcare Management Forum* 33(1): 10–18.

Cheng X and Peng G (2024) Study on the behavioral motives of algorithmic avoidance in intelligent recommendation systems. *Journal of Global Information Management (JGIM)* 32(1): 1–22.

Chew HSJ and Achananuparp P (2022) Perceptions and needs of artificial intelligence in health care to increase adoption: Scoping review. *Journal of Medical Internet Research* 24(1): e32939.

Coffey S, Maslovskaya O and McPhee C (2024) *Recent Innovations and Advances in Mixed-Mode Surveys*.

Cohen J (1988) *Statistical Power Analysis for the Behavioral Sciences*. New York: Routledge.

Cooke NA (2017) Posttruth, truthiness, and alternative facts: Information behavior and critical information consumption for a new age. *The Library Quarterly* 87(3): 211–221.

Coskun AB, Elmaoglu E, Buran C, et al. (2024) Integration of chatgpt and E-health literacy: Opportunities, challenges, and a look towards the future. *Journal of Health Reports and Technology* 10(1): e139748.

Crook B, Stephens KK, Pastorek AE, et al. (2016) Sharing health information and influencing behavioral intentions: The role of health literacy, information overload, and the internet in the diffusion of healthy heart information. *Health Communication* 31(1): 60–71.

Demartini G, Mizzaro S and Spina D (2020) Human-in-the-loop artificial intelligence for fighting online misinformation: Challenges and opportunities. *IEEE Data Eng. Bull* 43(3): 65–74.

Duplaga M, Smola P and Wojcieszko M (2024) The interplay of technology anxiety and digital health literacy in determining e-health readiness. *European Journal of Public Health* 34(Supplement_3): ckae144. 1180.

Dzangare G and Gulu TA (2025) Adopting artificial intelligence for health information literacy: A literature review. *Information Development*: 02666669251314839. https://doi.org/10.1177/02666669251314839.

Elias RA (2021) US National artificial intelligence strategy against the made in China 2025 policy. *Contemporary Chinese Political Economy and Strategic Relations* 7(1): 447–482.

Esmaeilzadeh P (2020) Use of AI-based tools for healthcare purposes: A survey study from consumers' perspectives. *BMC Medical Informatics and Decision Making* 20: 1–19.

Familoni BT and Onyebuchi NC (2024) Advancements and challenges in AI integration for technical literacy: A systematic review. *Engineering Science & Technology Journal* 5(4): 1415–1430.

Feng X, Wang L, Yan Y, et al. (2021) The sustainability of knowledge-sharing behavior based on the theory of planned behavior in Q&A social network community. *Complexity* 2021(1). https://doi.org/10.1155/2021/1526199.

Griffin RJ, Dunwoody S and Neuwirth K (1999) Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental Research* 80(2): S230–S245.

Guo J and Li B (2018) The application of medical artificial intelligence technology in rural areas of developing countries. *Health Equity* 2(1): 174–181.

Hälterlein J (2024) Imagining and governing artificial intelligence: The ordoliberal way—an analysis of the national strategy 'AI made in Germany'. *AI & SOCIETY* 40: 1749–1760.

Hamid M and Tahir R (2023) Use of the internet as source of information for students: A case study of university of kotli AJ&K: Use of the internet as source of information for students. *International Journal of Emerging Trends in Education* 1(2): 1–11.

Hatem R, Simmons B and Thornton JE (2023) A call to address AI "hallucinations" and how healthcare professionals can mitigate their risks. *Cureus* 15(9): e44720. https://doi.org/10.7759/cureus.44720.

Huq SM, Maskeliūnas R and Damaševičius R (2024) Dialogue agents for artificial intelligence-based conversational systems for cognitively disabled: A systematic review. *Disability and Rehabilitation: Assistive Technology* 19(3): 1059–1078.

Ivanov S, Soliman M, Tuomi A, et al. (2024) Drivers of generative AI adoption in higher education through the lens of the theory of planned behaviour. *Technology in Society* 77: 102521.

Jia C and Li P (2024) Generation z's health information avoidance behavior: Insights from focus group discussions. *Journal of Medical Internet Research* 26: e54107.

Johnson JD and Meischke H (1993) A comprehensive model of cancer-related information seeking applied to magazines. *Human Communication Research* 19(3): 343–367.

Kajiwara Y and Kawabata K (2024) AI Literacy for ethical use of chatbot: Will students accept AI ethics? *Computers and Education: Artificial Intelligence* 6(1): 100251.

Kang EY-N, Chen D-R and Chen Y-Y (2023) Associations between literacy and attitudes toward artificial intelligence–assisted medical consultations: The mediating role of perceived distrust and efficiency of artificial intelligence. *Computers in Human Behavior* 139: 107529.

Kim J, Kadkol S, Solomon I, et al. (2023) AI anxiety: a comprehensive analysis of psychological factors and interventions. *Available at SSRN 4573394*. 1–17.

Kimiafar K, Sarbaz M, Tabatabaei SM, et al. (2023) Artificial intelligence literacy among healthcare professionals and students: A systematic review. *Frontiers in Health Informatics* 12: 68.

Kline RB (2023) *Principles and Practice of Structural Equation Modeling*. New York, USA: Guilford publications.

Ko MA, Shah UN and Agrawal T (2023) AI In disease avoidance: Recognition, therapy and healthcare. In: *2023 International conference on advances in computation, communication and information technology (ICAICCIT)*, pp.950–955: IEEE.

Koltay T (2017) Data literacy for researchers and data librarians. *Journal of Librarianship and Information Science* 49(1): 3–14.

Koski E, Scheufele EL, Karunakaram H, et al. (2022) Understanding disparities in healthcare: Implications for health systems and AI applications. In: *Healthcare Information Management Systems: Cases, Strategies, and Solutions*. New York: Springer, 375–387.

Lee D and Yoon SN (2021) Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. *International Journal of Environmental Research and Public Health* 18(1): 71.

Lekadir K, Osuala R, Gallin C, et al. (2021) FUTURE-AI: guiding principles and consensus recommendations for trustworthy artificial intelligence in medical imaging. arXiv preprint arXiv:2109.09658.

Li W, Xu S, Zheng X, et al. (2024) Bridging the knowledge gap in artificial intelligence: The roles of social media exposure and information elaboration. *Science Communication* 46(4): 399–430.

Lund BD, Mannuru NR and Agbaji D (2024) AI Anxiety and fear: A look at perspectives of information science

students and professionals towards artificial intelligence. *Journal of Information Science*: 01655515241282001. https://doi.org/10.1177/01655515241282001.

Malik A, Mahmood K and Islam T (2023) Understanding the Facebook users' behavior towards COVID-19 information sharing by integrating the theory of planned behavior and gratifications. *Information Development* 39(4): 750–763.

Markus A, Pfister J, Carolus A, et al. (2024) Effects of AI understanding-training on AI literacy, usage, self-determined interactions, and anthropomorphization with voice assistants. *Computers and Education Open* 6: 100176.

Mehrabian A and Russell JA (1974) *An Approach to Environmental Psychology*. Cambridge, MA, USA: the MIT Press.

Mohan G, Satish G, Patil H, et al. (2023) AI-powered Chatbot for bridging language barriers with translation. In: *2023 3rd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)*, pp.1559–1565: IEEE.

Moulaei K, Yadegari A, Baharestani M, et al. (2024) Generative artificial intelligence in healthcare: A scoping review on benefits, challenges and applications. *International Journal of Medical Informatics* 188: 105474. https://doi.org/10.1016/j.ijmedinf.2024.105474.

Nadarzynski T, Miles O, Cowie A, et al. (2019) Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study. *Digital Health* 5: 2055207619871808.

Ng DTK, Leung JKL, Chu SKW, et al. (2021) Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence* 2: 100041.

Nguyen T-M, Nham PT and Hoang V-N (2019) The theory of planned behavior and knowledge sharing: A systematic review and meta-analytic structural equation modelling. *VINE Journal of Information and Knowledge Management Systems* 49(1): 76–94.

Nunziato DC (2020) Misinformation mayhem: Social media platforms' efforts to combat medical and political misinformation. *First Amendment Law Review*. 19: 32. https://ssrn.com/abstract=3672.

Okonji OR, Yunusov K and Gordon B (2024) Applications of Generative AI in Healthcare: algorithmic, ethical, legal and societal considerations. arXiv preprint arXiv:2406.10632.

Pataranutaporn P, Danry V, Leong J, et al. (2021) AI-generated characters for supporting personalized learning and well-being. *Nature Machine Intelligence* 3(12): 1013–1022.

Platt J, Nong P, Smiddy R, et al. (2024) Public comfort with the use of ChatGPT and expectations for healthcare. *Journal of the American Medical Informatics Association* 31(9): 1976–1982.

Risteska A (2023) Aware and critical navigation in the media landscape:(un) biased algorithms and the need for new media literacy in the era of artificial intelligence and digital media. *КАЙРОС: Журнал за медиуми и комуникации* 2(2): 16–38.

Russell RG, Novak LL, Patel M, et al. (2023) Competencies for the use of artificial intelligence–based tools by health care professionals. *Academic Medicine* 98(3): 348–356.

Sai S, Gaur A, Sai R, et al. (2024) Generative ai for transformative healthcare: A comprehensive study of emerging models, applications, case studies and limitations. *IEEE Access* 12(1): 31078–31106.

Schiavo G, Businaro S and Zancanaro M (2024) Comprehension, apprehension, and acceptance: Understanding the influence of literacy and anxiety on acceptance of artificial intelligence. *Technology in Society* 77: 102537.

Shah SB, Thapa S, Acharya A, et al. (2024) Navigating the web of disinformation and misinformation: Large language models as double-edged swords. *IEEE Access*: 1–3. https://doi.org/10.1109/ACCESS.2024.3406644.

Shahrzadi L, Mansouri A, Alavi M, et al. (2024) Causes, consequences, and strategies to deal with information overload: A scoping review. *International Journal of Information Management Data Insights* 4(2): 100261.

Shahsavar Y and Choudhury A (2023a) *The Role of AI Chatbots in Healthcare: A Study on User Intentions to Utilize ChatGPT for Self-Diagnosis*. JMIR Preprints.

Shahsavar Y and Choudhury A (2023b) User intentions to use ChatGPT for self-diagnosis and health-related purposes: Cross-sectional survey study. *JMIR Human Factors* 10(1): e47564.

Shamlou Z, Saberi MK and Amiri MR (2022) Application of theory of planned behavior in identifying factors affecting online health information seeking intention and behavior of women. *Aslib Journal of Information Management* 74(4): 727–744.

Shen Z, Wei S-Y, Adeeb H, et al. (2024) The negative consequences of avoiding health information on health risk behaviors: An SOR perspective. *Information Development*. 02666669241308211. https://doi.org/10.1177/02666669241308211.

Soper DS (2020) A-priori sample size calculator for structural equation models [Software].

Soroya SH, Rehman AU and Faiola A (2024) Exploring the impact of internet and media sources exposure on self-care behavior: Mediating the role of health anxiety, literacy and information-seeking behavior. *Kybernetes* 53(11): 4797–4817.

Southworth J, Migliaccio K, Glover J, et al. (2023) Developing a model for AI across the curriculum: Transforming the higher education landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence* 4: 100127.

Stenzl A, Armstrong AJ, Sboner A, et al. (2024) Artificial INtelligence to support informed DEcision-making (INSIDE) for improved literature analysis in oncology. *European Urology Focus* 10(6): 1011–1018.

Stenzl A, Sternberg CN, Ghith J, et al. (2022) Application of artificial intelligence to overcome clinical information overload in urological cancer. *BJU international* 130(3): 291–300.

Wahl B, Cossy-Gantner A, Germann S, et al. (2018) Artificial intelligence (AI) and global health: How can AI contribute to health in resource-poor settings? *BMJ global Health* 3(4): e000798.

Wang C, Wang H, Li Y, et al. (2024a) Factors influencing university students' behavioral intention to use generative artificial intelligence: Integrating the theory of planned behavior and AI literacy. *International Journal of Human–Computer Interaction*: 1–23. https://doi.org/10.1080/10447318.2024.2383033.

Wang L, Zhang S and Naeem SB (2024b) Modeling the predictors of health information avoidance behavior: Implications from the stimulus organism response (S-O-R) theory. *Journal of Librarianship and Information Science*: 09610006241290265. https://doi.org/10.1177/09610006241290265.

West SG, Finch JF and Curran PJ (1995) Structural equation models with nonnormal variables: Problems and remedies.

Wu PF, Summers C, Panesar A, et al. (2024) AI Hesitancy and acceptability—perceptions of AI chatbots for chronic health management and long COVID support: Survey study. *JMIR Human Factors* 11: e51086–e51086.

Yuan K-H, Bentler PM and Zhang W (2005) The effect of skewness and kurtosis on mean and covariance structure analysis: The univariate case and its multivariate implication. *Sociological Methods & Research* 34(2): 240–258.

Zhang J, Oh YJ, Lange P, et al. (2020) Artificial intelligence chatbot behavior change model for designing artificial intelligence chatbots to promote physical activity and a healthy diet. *Journal of Medical Internet Research* 22(9): e22845.

Zhang P and Kamel Boulos MN (2023) Generative AI in medicine and healthcare: Promises, opportunities and challenges. *Future Internet* 15(9): 86.

Zhao B-Y, Chen M-R, Lin R, et al. (2024) Influence of information anxiety on core competency of registered nurses: Mediating effect of digital health literacy. *BMC Nursing* 23(1): 1–11.

1.2.2 基于交互式在线教育平台应用的混合教学模式探究--以文献检索课为例

SCAULIB202625766

检索证明

根据委托人提供的论文材料，委托人华南农业大学图书馆 刘洋(学科类型:人文社科) 2 篇论文收录情况如下表。

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	基于交互式在线教育平台应用的混合教学模式探究——以文献检索课为例	韶关学院学报 出版年：2022 出版日期：2022-02-15 卷期：43 02 页码：- 文献号： 文献类型：期刊论文	第一作者	普刊类	华南农业大学图书馆	CNKI	无	无
2	理性网络信总观与信息传播自律	传媒论坛 出版年：2024 出版日期：2024-09-25 卷期：7 18 页码：- 文献号： 文献类型：期刊论文	通讯作者	普刊类	华南农业大学图书馆	CNKI	无	无

说明：论文等级和中科院大类分区按《华南农业大学学术论文评价方案（试行）》划分。

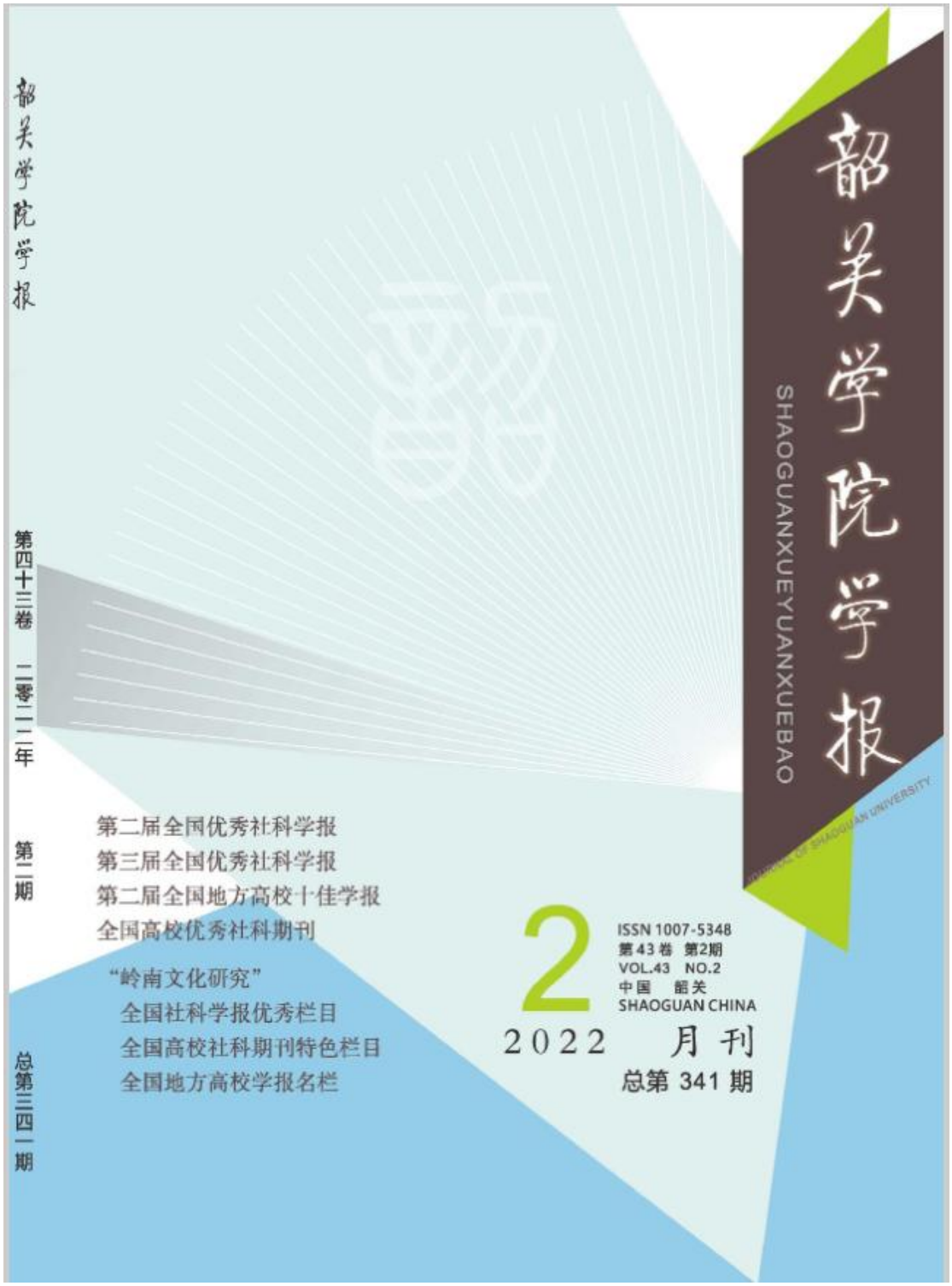
报告免责声明:如未盖章,报告无效

检索员：尹银林

华南农业大学图书馆

信息检索专用章

2026-03-10


韶关学院学报
SHAOGUANXUEYUANXUEBAO
JOURNAL OF SHAOGUAN UNIVERSITY
第四十三卷 二零二二年 第二期 总第三四一期
第二届全国优秀社科学报
第三届全国优秀社科学报
第二届全国地方高校十佳学报
全国高校优秀社科期刊
"岭南文化研究"
全国社科学报优秀栏目
全国高校社科期刊特色栏目
全国地方高校学报名栏
2
ISSN 1007-5348
第43卷 第2期
VOL.43 NO.2
中国 韶关
SHAOGUAN CHINA
2022 月刊
总第 341 期

韶关学院学报

SHAOGUAN XUEYUAN XUEBAO

JOURNAL OF SHAOGUAN UNIVERSITY

编辑委员会

主　任 | 廖　益

副主任 | 赵三银　王焰安

委　员 | （以姓氏笔画为序）

王羽梅　王桂忠

王群英　王焰安

车贵成　田广增

仲红卫　严兴文

肖华茂　宋　杰

陈晓远　何金明

苗德成　郑春龙

官建生　赵三银

钟瑞敏　徐　剑

郭会时　黄长征

黄振伟　韩登池

阚哲华　廖　益

戴经国

主　编 | 廖　益

副主编 | 王焰安

秘　书 | 邵晓军

2 2022

第43卷　第2期

Vol.43　No.2

月刊，1980年创刊

Monthly, Started in 1980

2022年第2期，总第341期

No.2, 2022, Sum. No.341

中国韶关 | SHAOGUAN CHINA

非物质文化遗产视角下的大学英语文化课程设计研究……黄　盛，曾旭暾（ 64 ）

粤港澳大湾区高职旅游教育发展路径研究

——以文旅融合为背景……麦菜思，郭璇瑄（ 71 ）

【教育教学研究】

基于“产出导向法”的大学英语视听说课程教学理念及设计

——以《新视野大学英语视听说》教程 2 为例……金　丽（ 77 ）

旅游英语课程线上线下混合式教学模式探索……李　澜（ 82 ）

基于交互式在线教育平台应用的混合教学模式探究

——以文献检索课为例……刘　洋（ 87 ）

【中等教育研究】

中美中小学在线教育质量评价标准研究……黄德群（ 92 ）

“历史小栈”微信公众号辅助高中历史教学设计探究……杨智画，安素平（ 100 ）

高中绘画模块教学中存在的问题及对策

——以油彩创意绘画教学为例……刘　建（ 104 ）

牛仔袋……欧善勇（封二）

兰阁暖香……郑红雨（封三）

本期执行编辑：陈　娜　　英文编辑：刘爽娜　　编务技术编辑：李　婉　　封面设计：卢成杰

基于交互式在线教育平台应用的混合教学模式探究
——以文献检索课为例

刘 洋
（华南农业大学 图书馆，广东 广州 510642）

摘要：运用“华南农业大学在线教育综合平台”构建基于“在线教育平台”的三级交互混合教学模式，对文献检索课程进行教学改革。在课程内容中增加“微视频”“推荐视频”等录制课程，丰富教学内容；重新设计考核指标，增加检索实操分数占比，体现课程目标。使学生真正感受到文献检索课的工具性和实用性，激发学生的专业学习兴趣，提高学生自主学习能力、创新能力和信息素养能力。

关键词：在线教育平台；交互式混合教学；文献检索课；教学改革
中图分类号：G642.0 **文献标识码：**A **文章编号：**1007-5348(2022)02-0087-05

大学生作为高校人才培养的对象，信息获取和信息运用能力是基本技能之一[1]，能够进行信息判读和利用也是科学素养的体现。文献检索课作为一门工具课，可以提升大学生的信息素养能力，是较为直接提升大学生信息意识、信息获取能力的途径之一[2]。

自1984年教育部印发《关于在高等学校开设文献检索与利用课的意见》通知以来[3]，高校图书馆就把开设文献检索课作为一项重要的工作。经过30多年的发展，文献检索课的教学模式也在不断探索革新[4]。华南农业大学作为一所以教学型为主的高校，授课讲解是培养学生的主要手段，也是学生汲取知识的关键环节，是直接关系学生创新思维和实践能力培养的基础。目前文献检索课程存在学生实际操作能力不足、课程设置和考核指标不合理等问题。针对以上问题，文献检索课程的教学内容和模式也应顺应学校发展，探索革新。开展以融合网络媒体、移动媒体技术的混合教学模式，既能丰富教学手段，设计人性化教学平台；增强教学过程中的互动性[5]。

以“华南农业大学在线教育综合平台”（以下称“在线教育平台”）作为交互工具，构建基于“在线教育平台”的交互式混合教学模式，从教学手段、教学内容以及教学评估三方面进行文献检索课程改革探讨。同时，对教学内容进行调整，增加数据库实操和检索报告撰写部分，突出课程的工具性。在线上教学阶段增加课程录播、微视频、推荐视频等栏目，丰富教学内容。对考核的指标重新设计，将笔试及论文考核转变为撰写检索实验报告，增加检索实操的分数占比，体现课程目标。

一、交互式在线平台混合教学模式的构建

在中国知网、SSCI等数据库平台上针对SU=（混合教学+混合学习+翻转课堂）and（“教学平台”），主题=（“Flipped or Inverted Classroom or MOOC”）and（“educa* platform*）时间为2019-2021年，共检索到文献1 218篇，通过筛选，共搜索到有效文献1 096篇，有效率90%。通过分析文献：目前多所高校的文献检索课程开始采用混合式教学模式。其中，有中国科技大学罗昭锋的《文献管理与信息分析》和武汉大学黄如花教授的《信息检索》等信息

[收稿日期]2021-12-16
[基金项目]华南农业大学教育教学研究与教改课题“基于交互式在线教育平台应用的混合教学模式探究——以文献检索课为例”（K19267）
[作者简介]刘洋（1989-），女，内蒙古包头人，华南农业大学图书馆馆员，硕士；研究方向：文献资源及知识产权服务。

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

素养类 MOOC 课程上线[6]，带动了国内信息素养类课程混合式教学模式的改革。

华南农业大学文献检索课程是一门全校性公选课，开课历史较长，自开展文献检索课教学以来一直致力于不断优化和完善。笔者在 2018 学年秋季班采用问卷调查的方式，进行摸底调查，问卷涉及教学内容及教学手段的接受程度，共回收问卷 132 份，89% 的学生希望文献检索课程教学内容可以涉及本专业学术资源的搜索，98% 的学生希望有课堂回放并且可以采用线上的方式进行讲授。根据学生的反馈，结合图书馆实际，课程采用线上线下的混合方式进行，并对课程的内容进行优化调整。确定采用“华南农业大学在线教育综合平台”作为媒介，以 2019–2020 学年教学实践为例，对 699 名本科生采用“华南农业大学在线教育综合平台 +QQ 课程交流群 + 在线直播”的混合式在线教学模式进行实践教学，并测试课程改革效果。

（一）教学手段改革

在本次教学改革探索中，教师团队组建在线教学共同体，利用在线教育平台进行教学模块设计。根据教学大纲设定教学目标，改革后的课程在保留部分课堂授课模式基础上，增加线上直播录播课程，在教学平台上推出 MOOC 推荐板块和微视频，在视频教学中嵌入图片、动画、文本资料和网页的截图，学生在生动的短视频中掌握教学内容从而达到教学目标[6]。见表 1。

表 1　文献检索视频课程

教学板块	大纲要求	学习目标	MOOC 及视频
模块一：课程概述	学生应了解文献检索课程的意义与目标；信息意识与信息素养；课程内容安排及考核方式介绍。	具有基本的信息素养和信息意识，能够利用所学文献检索知识，分类解决问题。	录播视频 1 个及相关链接推荐 1 个
模块二：文献信息的基本知识	文献及其相关概念；文献的分类及参考文献著录规则。	掌握文献与信息检索的基本知识，掌握信息检索的基本原理和方法。	录播视频 2 个及相关链接推荐 7 个
模块三：信息检索的基本知识及数据库应用	了解信息检索的概念；对信息检索语言、检索工具及检索技术进行介绍；重点掌握信息检索步骤及检索结果的评价；熟悉在专业数据库中进行检索以及检索结果的排序和精炼。	掌握计算机检索技术和方法、常用信息检索系统的使用方法；具有获取网络文献信息的途径与方法的能力。	录播视频 5 个及相关链接推荐 8 个
模块四：文献信息的利用	引导学生阅读文献，恪守学术道德；使学生了解学术论文写作的基本格式与写作程序；重点掌握文献综述的撰写方法。	掌握自主学习和终身学习所需的工具。	录播视频 1 个

（二）教学内容设计

团队从课程预期教学目标出发，确定教学内容和教学模式。在传统公共教学内容的基础上，增加检索实操内容的安排以及检索报告撰写部分，锻炼学生实操能力，培养其科学写作素养。具体教学内容安排，见表 2。

表 2　交互式混合文献检索课程设计

教学板块	教学内容 / 实操内容	教学形式	课时安排
教学内容和专业特色	文献检索初识；文献检索基本知识（包括文献类型学习、检索主题词的选取、检索系统选择、检索语言构建、检索式编辑及改进、检索技巧运用等）专业课程开放文献获取途径；文献综述写作；学位论文写作规范化格式；各专业学科核心期刊目录获取以及论文投稿指南。	传统的固定班级讲授模式（课中） 在线教育平台的“在线测试”（课后） 在线教育平台“课程问卷”（课后）	14 课时（7 讲）
检索实操课程	中外文数据库介绍及操作（中国知网、SCI 等）；学科经典数据库检索操作（三大农业数据库、EBSCO–BSP 商管财经研究文献全文库、Ei CompendexWeb 数据库等）；期刊电子书数据库检索操作；搜索引擎和其他方式文献获取操作，文献管理软件工具操作等（NoteExpress）。	在线教育平台“播课单元”（课中） QQ 电话（课中） 在线教育平台“课程问卷”（课后）	8 课时（4 讲）
检索报告撰写	研究背景阐述、检索系统选择、检索式编辑、文献综述写作、参考文献管理等，通过报告撰写，模拟完成一个课题写作流程。	在线教育平台“研究性学习”（课中） 在线教育平台“课程问卷”（课后）	8 课时（4 讲）
检索报告分析交流	交流报告撰写经验及检索心得。	在线教育平台“成果展示”（课中） 传统的固定班级讲授模式（课中） 在线教育平台“课程问卷”（课后）	2 课时（1 讲）

)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

对于公共教学内容和专业特色教学内容，其授课形式仍为传统的固定班级讲授。课程内容包括文献检索初识、文献检索基本知识（包括文献类型学习、检索主题词的选取、检索系统选择、检索语言构建、检索式编辑及改进、检索技巧运用等），专业课程开放文献获取途径、文献综述写作、学位论文写作规范化格式，各专业学科核心期刊目录获取，以及论文投稿指南等，通过16个课时的主导式课堂教学，力求系统全面地为学生搭建文献检索基本理论框架；利用“在线教育平台”的在线测试功能和课程资源板块，上传课件内容，方便学生课下检测和巩固，从而克服单纯“翻转课堂”中学生只专注碎片知识而忽略系统知识的问题。

检索课程实操板块，主要采用线上教学的方式，通过“在线教育平台”的播课单元或QQ电话功能，进行线上录制实时教学，课程主要针对主要中外文数据库介绍及操作、学科经典数据库检索操作（三大农业数据库、EBSCO–BSP商管财经研究文献全文库、Ei CompendexWeb数据库等）、期刊电子书数据库检索操作，搜索引擎和其他方式文献获取操作，文献管理软件工具操作等（NoteExpress）。通过在线教学方式，学生可以自行选择网络环境稳定的地点进行收听观看，避免了因设备老旧或网络不稳定而无法进行同步操作的弊端。

检索报告撰写则是通过“在线教育平台”的研究性学习功能实现，通过教师设定报告格式，学生自行选择报告主题，根据要求完成报告的撰写，报告的撰写涉及研究背景阐述、检索系统选择、检索式编辑、文献综述写作、参考文献管理等，通过报告撰写，模拟完成一个课题写作的流程，这是文献检索综合性练习。

检索报告分析交流通过“线上”“线下”的方式完成。通过平台的成果展示栏目观看其他同学的研究主题，如果感兴趣可以自由加入其他同学的小组，共同或单独完成期中检索报告的撰写。线下课程，则是设置单独的2课时，教师通过学生检索作业，随堂抽取学生上台做演示，阐述检索过程和心得，台下的同学则根据阐述内容，指出检索时的一些错误，发言同学记录在课堂表现的评分栏中。

（三）教学评估改革

针对教学班的699位学生进行课程的学习评估。课题组使用“华南农业大学在线教育综合平台”统计学生上线时长及课件下载和视频浏览次数情况，作为自学效果的初步评估。通过研究主题模块，对课题的期中、期末报告情况进行评估反思。每周结合QQ聊天反馈情况，分析课程的难点问题，并在下次课程中进行二次讲解。

与传统“一考”定成绩不同，本次教学实践提高了实操分数的比例，从而更好地帮助学生将所学内容运用到实际专业课的学习中。根据课程安排，学生期末总成绩由检索练习实操（60%）、检索报告撰写（30%）、课堂表现和考勤（10%）三部分组成。其中检索练习实操包括线上听课演示和在线测评两个环节。检索报告撰写意在通过检索练习，让学生独立完成1–2篇检索报告，提高学生写作水平。检索报告质量的评估主要从报告研究目的及意义、检索词和检索系统选择、检索表达式构成、文献综述撰写、参考文献、报告格式等方面进行评估，其中相关检索知识运用、文献综述撰写各占评估的40%，其他内容占比20%。课堂表现和考勤主要考察学生课堂发言及上课出勤情况。

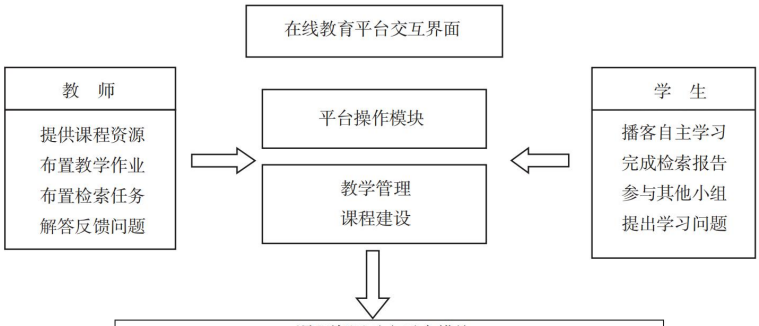
二、改革效果

通过两个学期的教学实践，运用华南农业大学在线教育平台工具，构建三级交互式课程体系，实现了教学方式从传统的讲授式转换为混合教学模式。传统教学中没有回放、学生实操能力得不到锻炼的情况有所改善，提升了学生积极性，课程效果得到了保障。本次教学改革完成了699名学生的授课过程跟踪以及档案管理，形成了混合式教学的教学大纲及课件，并上传至在线教育平台，完成视频录制9个，上传至QQ群及在线教学平台中，供学生自行下载观看学习，推荐相关MOOC课程及链接16个，时长超过1 000小时，在线教育平台累计访问次数1 000余次，平台访问次数排名全校第一。通过教学改革，文献检索课程的教学效果及学生课程评价分数得到提高。

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

（一）形成完整的混合教学体系

本次教学模式的改革，形成了一套完整的文献检索课程三级交互式平台混合教学体系[7]，并按体系运行了 2 个学期。见图 1。



课程资源对应平台模块		
教学管理	QQ 答疑	解答课上课下问题,实时调节难度
	课程通知	采用线上线下的上课方式,灵活通知学生上课地点
课程建设	课程资源	多媒体教学课件，“微课”视频，MOOC 课程推荐等
	课堂测试	对网络的课程进行课后测试，以便检查网络课程效果
	课程问卷	课程调研，跟踪改进教学方式

图 1　混合教学体系运行图

运行过程包括：

（1）学生在在线教学平台观看推荐视频自主预习——课堂讲授并布置作业——在线教育平台上完成小组组建并完成作业——课堂展示——教学平台调查 /QQ 群问题提问——教学平台 /QQ 群 / 课堂解答——终期考核。

（2）学生在在线教学平台观看推荐视频自主预习——在线网络课程演示并录制——学生温习录制视频并课后操作——教学平台研究学习模块完成作业——课堂展示 / 在线分享屏幕展示——终期考核。

（二）教学内容及教学方式在研究生课程中得到推广

近年来，多数高校采用混合教育模式进行日常的教学，混合教学模式逐渐被同学和教师认可。研究生比本科生有更明确的文献需求，对于数据库的操作要求也更高，线上教学解决了统一电脑配置较低、学生扎堆进入数据库导致网速慢的问题。本次教学改革后期，尝试将混合教学方式和部分教学内容在研究生网络信息资源检索与利用的课程中进行推广。运用华南农业大学在线教育平台，提醒研究生完成专业文献检索作业，并反馈检索情况。针对理工科学生，开展独立的专利检索模块，让学生深入研究团队和创业团队，鼓励学生带着问题、带着产品进行专利检索，完成了嵌入式的教学模式推广。

三、结语

信息素养类课程作为本科生通识教育的重要部分，要求通过文献检索课程学习，培养本科生的信息素养和信息能力，达到学生汲取新知识、改善知识结构，提高自主学习和创新研究能力的目的。本次教学改革依托交互式华南农业大学在线教育平台，实现了教学情况实时反馈、检索实验实时展示等教学目标。改革后学生课后观看回放次数增多，数据库访问次数增多，实操能力得到锻炼。在文献检索报告撰写方面，学生对检索主题选择、检索词确定更加严谨、准确，对有效数据的处理能力有较大提高。交互式的教学方式实现了由教师引导、学生自主学习的良性循环，促进了学生的创新能力与信息素质的培养。

1994-2023 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

参考文献：

[1]邓蕾 . 大学生信息能力培养现状调查与研究[D]. 太原：山西财经大学, 2015.

[2]曹力萌, 马丽萍, 朱昭萍, 等 . 基于信息素养的文献检索课教学模式建构——以甘肃农业大学为例[J]. 农业图书情报学刊, 2017(10)：131-133.

[3]教育部 . 关于在高等学校开设文献检索与利用课的意见[EB/OL]. [2021-09-20]. https：//www.66law.cn/tiaoli/149428.aspx.

[4]王金凤 . 双一流背景下高校信息素养课程质量提升研究——以西藏大学信息检索课为例[J]. 科技风, 2018(36)：57-59.

[5]席亚军 . 新媒体时代高校“文献检索”课教学改革研究[J]. 江苏科技信息, 2017(30)：61-62.

[6]贺映兰, 林濂瑜, 李文波 . 高校文献检索课程的混合式在线教学实践[J]. 情报探索, 2021(2)：96-104.

[7]王刚, 赵学铭 . 交互式移动教学平台的设计与效果分析——以文献检索课程为例[J]. 情报理论与实践, 2017(1)：127-131.

Research on Hybrid Teaching Model Based on Application of Interactive Online Education Platform

——Taking Document Retrieval Course as an Example

LIU Yang

(Library, South China Agricultural University, Guangzhou 510642, Guangdong, China)

Abstract： Using the comprehensive online education platform of South China Agricultural University to construct a three-level interactive mixed teaching model based on the online education platform, the teaching reform of document retrieval course was carried out. Recorded resources such as “micro-video” and “recommend video” are added in online class to enrich class content. At the same time, the course assessment index is altered and the proportion of the score of daily retrieval practice is increased. Through this teaching reform, we can make students feel the tool and practice of literature retrieval course, stimulate students’ interest in professional learning, improve students’ self-independent learning and innovation capacity, cultivate students’ information literacy.

Key words： online education platform; interactive mixed teaching; document retrieval course; teaching reform

(责任编辑：廖铭德)

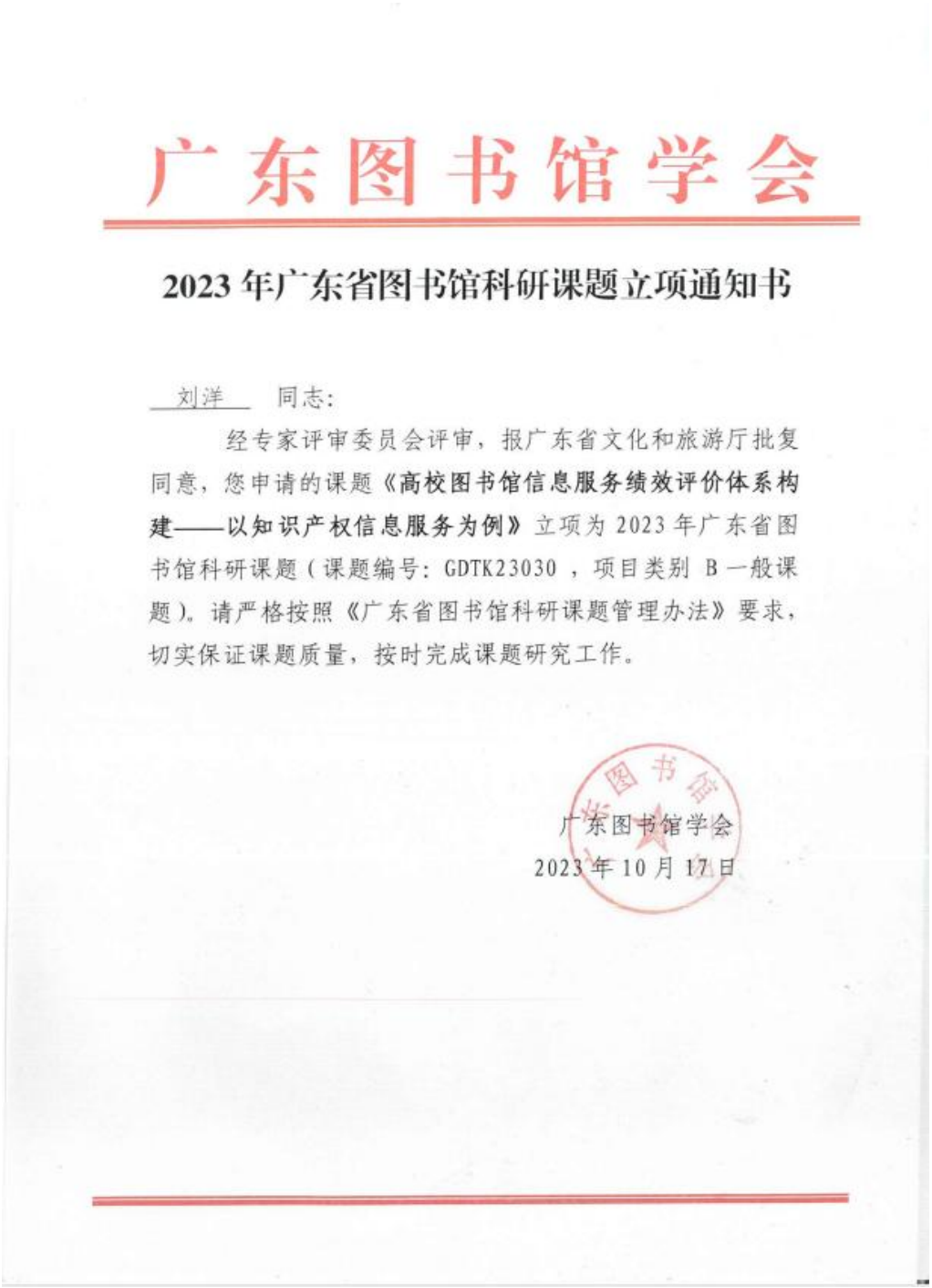
(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

二、科研项目

2.1 主持的项目

2.1.1 高校图书馆信息服务绩效评价体系构建--以知识产权信息服务为例相关材料(B 类)

（1）立项书



广东图书馆学会

2023 年广东省图书馆科研课题立项通知书

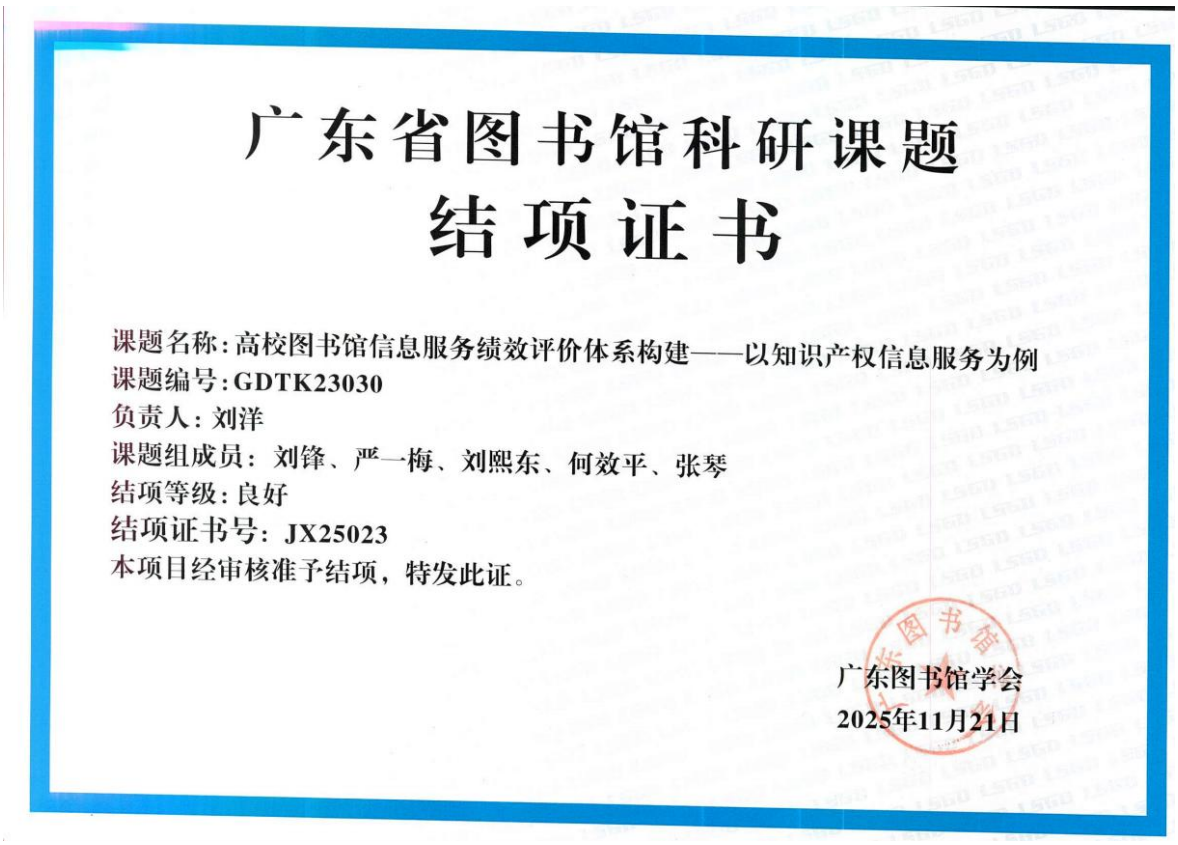
刘洋 同志:

经专家评审委员会评审，报广东省文化和旅游厅批复同意，您申请的课题《**高校图书馆信息服务绩效评价体系构建——以知识产权信息服务为例**》立项为 2023 年广东省图书馆科研课题（课题编号：GDTK23030 ，项目类别 B 一般课题）。请严格按照《广东省图书馆科研课题管理办法》要求，切实保证课题质量，按时完成课题研究工作。

广东图书馆学会

2023 年 10 月 17 日

（2）结项书



广东省图书馆科研课题
结项证书

课题名称：高校图书馆信息服务绩效评价体系构建——以知识产权信息服务为例
课题编号：GDTK23030
负责人：刘洋
课题组成员：刘锋、严一梅、刘熙东、何效平、张琴
结项等级：良好
结项证书号：JX25023
本项目经审核准予结项，特发此证。

广东图书馆学会
2025年11月21日

（3）部分申请书

编号：

广东省图书馆科研课题

立项申请书

项 目 类 别 B 一般课题

课 题 名 称 高校图书馆信息服务绩效评价体系构建

——以知识产权信息服务为例

成 果 形 式 A 论文 B 研究报告

计划完成时间 2025 年 09 月 30 日

负 责 人 刘洋 职称/职务 馆员

所 在 单 位 华南农业大学

填 表 日 期 2023 年 07 月 08 日

广东图书馆学会制

2023 年 07 月

申请者的承诺：

我承诺对本人填写的各项内容的真实性负责，保证没有知识产权争议。如果获准立项，我承诺以本表为有约束力的协议，遵守广东图书馆学会的有关规定，按计划完成课题，取得预期成果。

申请者（签章）：刘洋

2023 年 7 月 14日

推荐单位的承诺：

本单位承诺对申报者填写的各项内容的真实性负责，保证没有知识产权争议。如果获得立项，承诺以本表为有约束力的协议，遵守广东图书馆学会的有关规定，为本课题提供必要的支持，做好课题研究的协调和管理工作，对本课题的完成提供信誉保证。

单位（盖章）：

2023 年 7 月 14日

二、课题论证

1. 本课题国内外研究现状述评及研究意义。2. 研究的主要内容、基本思路和方法、重点难点、主要观点和创新之处。3. 前期相关研究成果和主要参考文献。限5000字以内。

0.引言

知识产权保护是创新的基础要素。党的二十大报告指出，完善科技创新体系，加强知识产权法治保障，形成支持全面创新的基础制度。为此国务院印发《知识产权强国建设纲要（2021～2035）》指明要大力发展高水平的知识产权专门化服务机构，有效利用信息技术提高知识产权公共服务效率。高校图书馆具有数据资源和人才资源优势，为充分发挥资源优势向社会提供知识产权信息服务，国家知识产权局、教育部联合出台《高校知识产权信息服务中心建设实施办法（修订）》（以下简称《实施办法》），根据《实施办法》国家知识产权局、教育部将在有条件高校建立高校知识产权信息服务中心（以下简称“信息服务中心”），开展知识产权信息服务工作[1]。

目前高校知识产权信息服务中心主要依托各高校图书馆开展业务，其提供的高质量知识产权信息服务，将在参与产学研协同创新、科研人员的知识产权教育等方面发挥作用。根据《实施办法》考核规定，高校知识产权信息服务中心认定周期为5年，从首批高校知识产权信息服务中心遴选名单公示（2019年）至今，第一、二批高校知识产权信息服务中心临近考核。“全流程”的知识信息服务包括服务前人员培训、设备硬件完善；服务中的知识产权信息素养教育、科研专利布局、专利导航、知识产权分析评议等；服务后的持续跟踪、应用推广等。其提出更符合目前各服务中心业务发展目标。

本课题以《实施办法》为指导，从知识产权信息服务“全流程”视角[2]，探索高校知识产权信息服务的考核评价体系，推动高校知识产权信息服务工作有效进行和高质量发展，为政府相关部门开展考核工作提供参考依据。

课题将高校图书馆知识产权信息服务从五个维度建立考核体系，即服务基础、流程制度、人员经费、服务内容和服务成效五个维度。同时“五维度”再细化指标，建立分层指标。利用层次分析法(AHP)和模糊综合评价法，量化维度和指标的权重，通过已有高校知识产权信息服务中心数据进行实证检验。为高校图书知识产权信息服务建立绩效考核样板，量化服务成效，提高服务质量。

1.1国内外研究现状

Peter.F.Drucher指出，没有评价就没有管理。高校图书馆的绩效考核结果关系着图书馆工作的发展方向及服务质量，如何建立科学的绩效考核制度，激励高校图书馆提供高质量服务，备受业界关注。

国外学者从评价方法、评价工具出发，探究图书馆的绩效考核情况。在评价方法中传统的图书馆绩效评价采用输入-过程-输出模型[3-5]，但这样的考核缺乏对图书馆员服务的考核，只是单纯强调图书馆的物理属性。Baker 和 Lancasterd等学者通过引入多种因素例如：经济绩效、产出服务质量、读者满意度等对图书馆服务进行评价考核[6, 7]。其中运用混合评价法评估图书馆工作绩效是目前主要的评估方法。混合评价法综合了图书馆员服务水平，做到定量化研究，Yim. M利用混合评价法通过用户调查、焦点小组讨论、关键信息提供、工作人员访谈等7种数据搜集法，评价纳米比亚地区图书馆的服务成

2.1.2 新时期网络舆情对大学生情感取向演化的模型研究相关材料（2020WQNCX007）(C 类)

（1）立项书

广 东 省 教 育 厅

粤教科函〔2020〕6 号

广东省教育厅关于公布 2020 年度普通高校认定类科研项目立项名单的通知

各有关高校：

为深入实施创新驱动发展战略，落实《广东省教育厅 广东省科学技术厅关于印发科教融合协同推进高校科技创新能力提升工作计划的通知》（粤教科函〔2019〕57 号），2020 年省教育厅结合“创新强校工程”组织开展科研项目认定工作。经学校评审、省教育厅组织审核，现将通过认定方式批准立项的 2020 年度特色创新和青年创新人才科研项目立项名单（见附件）下达各高校。

请各高校按照《广东省高等教育“创新强校工程”专项资金管理办法》（粤财教〔2014〕130 号）及相关科研平台项目管理办法，统筹安排项目资金，加强资金管理，督促项目承担人按照项目申请书开展建设工作，协助解决项目实施过程中遇到的困难和问题，确保研究项目如期完成目标任务。

附件：1.2020年度广东省普通高校特色创新项目立项名单

2.2020年度广东省普通高校青年创新人才项目立项名单



广东省教育厅

2020年9月28日

（联系人及电话：黄俊彦，020-37628271；高庆，020-37627742）

公开方式：主动公开

校对人：高庆

— 2 —

序号	项目编号	项目名称	负责人姓名	所属学校
6	2020WQNCX006	农户数字资本形成与培育机制研究	蔡轶	华南农业大学
7	2020WQNCX007	新时期网络舆情对大学生情感取向演化的模型研究	刘洋	华南农业大学
8	2020WQNCX008	交替传译停顿现象实证研究	宁静	南方医科大学
9	2020WQNCX009	嵌入性理论视角下基于护理站构建社区失能老年人居家照护模式研究	孙晓宁	广州中医药大学
10	2020WQNCX010	粤港澳大湾区高校教师职称制度研究	林姬佺	华南师范大学
11	2020WQNCX011	艺术教育与广东高校思政教育融合的实践与研究——以歌剧《江姐》（校园版）为例	李卢泰龙	华南师范大学
12	2020WQNCX012	城市节水政策的驱动机理、效果评价与路径优化研究	杜敏哲	华南师范大学
13	2020WQNCX013	汉语二语互动语用能力测评研究	陈卓	广东外语外贸大学
14	2020WQNCX014	吉莲？克拉克威尔士生态诗学研究	许景城	广东外语外贸大学
15	2020WQNCX015	德语母语和二语句子产出中语序与递增加工的关系研究	吴晓钢	广东外语外贸大学
16	2020WQNCX016	“一带一路”倡议下的中国对外投资空间格局及其演变机制研究	邹嘉龄	广东外语外贸大学
17	2020WQNCX017	贸易自由化背景下企业社会责任策略对出口贸易的影响机理及效应研究	刘乾	广东外语外贸大学
18	2020WQNCX018	法治视野下粤港澳大湾区建设主体角色定位研究	谢宇	广东外语外贸大学
19	2020WQNCX019	基于RPA的高校财务报销业务优化研究	林仰晴	广东外语外贸大学
20	2020WQNCX020	我国老年宜居社区政策的创新扩散	褚勇强	广东财经大学
21	2020WQNCX021	基于“多规合一”改革的广东市县国土空间用途管制研究	黄文浩	广东财经大学

（2）结项书

华南农业大学

华南农业大学关于报送广东省普通高校人文社会科学研究项目结题验收情况的函

广东省教育厅：

根据《广东省教育厅关于做好“创新强校工程”科研项目管理工作的通知》（粤教科函〔2017〕22号）要求，我校对《新文科视域下面向艺农融通的虚拟仿真实验教学强基增效研究》等28项人文社会科学研究项目结题材料（详见附件）进行形式审查，并组织专家严格按照合同书要求开展结题验收。现将有关结题验收结果报上，请予以审核备案。

附件：1. 规划项目结题验收备案表

2. 科研项目结题验收备案表

华南农业大学

2025年12月31日

科研项目结题验收备案表

承担单位（盖章）：华南农业大学　　填报日期：2025年12月25日

序号	项目类别	项目编号	项目名称	负责人	课题组成员	结题时间	结题验收形式	验收材料是否齐全	鉴定等级	备注
1	2023年广东省普通高校特色创新类项目（人文社科）	2023WTSCX009	重大动物疫病灾后应急防控的行为机理与策略优化研究	方敏	唐斌、张华、朱生伟、宋丽娟、方静之、崔泽华	2025年12月	通讯评审	齐全	良好	
2	2022年广东省普通高校特色创新类项目（人文社科）	2022WTSCX004	基于“三生空间”功能协同的珠三角水网地区传统村落重构策略研究	林蔚	李晖、黄家平、刘京一	2025年12月	通讯评审	齐全	良好	
3	2022年广东省普通高校青年创新人才类项目（人文社科）	2022WQNCX011	责任铁律与政策引导下的企业社会责任——基于精准扶贫与乡村振兴的视角	张京心	陈艳艳，龙思颖，宋冰洁	2025年12月	通讯评审	齐全	良好	
4	2022年广东省普通高校特色创新类项目（人文社科）	2022WTSCX006	新时代廉洁文化建设的 VR 动画传播与研究	李雷鸣	涂先智、张日新、项赠、陈旭	2025年12月	通讯评审	齐全	良好	
5	2021年广东省普通高校青年创新人才类项目（人文社科）	2021WQNCX002	“三全育人”视域下农业高校“乡村振兴”人才培养的模式研究	陈洋	徐峰、余璐、陈晓洁、梁耀明、仇童伟、张东彦	2025年12月	通讯评审	齐全	合格	
6	2020年广东省普通高校青年创新人才类项目（人文社科）	2020WQNCX007	习近平新时代网络舆论对大学生价值取向演化的模型研究	刘洋	余中杰、夏杰、骆威、黄威威、陈铃诗、田成	2025年12月	通讯评审	齐全	合格	
7	2022年广东省普通高校青年创新人才类项目（人文社科）	2022WQNCX009	产业升级背景下技术进步对农民工就业、收入及相关行为的影响机制研究-以广东省为例	李天成	李飞飞、王卓	2025年12月	通讯评审	齐全	合格	

（4）部分申请书

版本号：001

广东省教育科研项目（高校）
申报书

项 目 类 别：习近平新时代中国特色社会主义思想研究

项 目 名 称：习近平新时代网络舆情对大学生价值取向演化的模型研究

学 科 分 类：图书馆、情报与文献学

项目负责人：刘洋

负责人手机：15919683294

所 在 学 校：华南农业大学(盖章)

广东省教育科学规划领导小组办公室制
二〇二〇年六月

第1页

版本号：001

基本信息

项目信息	项目名称	习近平新时代网络舆情对大学生价值取向演化的模型研究		
	项目类别	习近平新时代中国特色社会主义思想研究		
	研究类型	应用研究	申请金额	3(万元)
	学科一	图书馆、情报与文献学 - 图书馆、情报与文献学其他学科		
	学科二	马克思主义 - 科学社会主义		
	学科三	新闻学与传播学 - 传播学		
	计划开始日期	2021.9	计划完成日期	2023.12
	所属单位	华南农业大学	所在学校	华南农业大学
	单位类型	高等院校		
	预期成果形式	论文		

合作单位	合作单位名称	联系人	联系电话	通讯地址

负责人信息	姓　名	刘洋	性　别	女	民　族	汉族
	出生年月	1989.11	学　历	研究生	学　位	硕士
	职　称	中级		职　务	馆员	
	办公电话	87586780		手　机	15919683294	
	一级学科	图书馆、情报与文献学		二级学科	图书馆、情报与文献学其他学科	
	电子邮件	liuy@scau.edu.cn		身份证号	150203198911140629	
	人才层次					
	研究专长	数据分析与应用				

摘要	习近平总书记在党的十九大提出要“坚定文化自信，推动社会主义文化繁荣兴盛”，加强网络话语传播平台的建设和管理，加强主流意识形态网络话语阵地建设是习近平新时代中国特色社会主义思想的重要组成部分，大学生是网络舆情感情极化的易感人群。课题将以网络时政信息作为舆情主体，通过建立情感极性和强度的二维情感演化模型，探析大学生对时政舆情的情感反馈机制，试图量化大学生对主流意识形态的情感取向强度，做好大学生的网络舆情引导工作。
关键字	习近平新时代，网络舆情，情感极性，情感强度，大学生

项目组成员

总数（含负责人）	高级	中级	初级	博士	硕士	学士
7	2	4	1	1	0	0

姓名	性别	出生年月	学位	职称	项目分工	工作单位	研究领域
余中杰	男	1990.1	硕士	中级	数据搜集整理	广州体育学院	结构工程
夏杰	男	1981.8	硕士	中级	收据采集,文献搜集	华南农业大学	图书资料
骆威	男	1986.1	博士	副高级	模型建立与检验	华南农业大学	大数据分析
黄威威	女	1982.1	博士	副高级	思想理论分析,论文撰写	华南农业大学	智慧党建
陈铃诗	女	1987.7	硕士	初级及以下	数据清洗,文献整理	华南农业大学	图书资料
田成	女	1991.5	硕士	中级	数据清洗	华南农业大学	情报搜集

预期成果

论文（篇）	总数	2
	其中：核心期刊（CSSCI 和北大核心）	
	SSCI、A&HCI、ISSHP 收录	
专著（部）		
研究报告（篇）		
其他		

经费申请表

（金额单位：万元）

预算科目	支持经费	备注（计算依据与说明）
图书资料费	0.2000 万元	
调研差旅费	0.7000 万元	
计算机机时费及其辅助设备购置和使用费	0.5000 万元	
购置文具费	0.0000 万元	
小型会议费	0.0000 万元	
咨询费	0.2000 万元	
印刷费	0.3000 万元	
复印费	0.5000 万元	
成果打印费	0.5000 万元	
其他	0.1000 万元	
合计	3.0000 万元	
与本项目有关的其他经费来源	其他计划资助经费	万元
	其他经费资助	万元
	其他经费合计	0.0000 万元

2.2 主要参加的项目

2.2.1 粤港澳联合承办十五运会和残特奥会对体育场馆数智技术发展与治理效果的研究(C 类)

（1）立项书



首页 > 通知公告

关于十五运会和残特奥会粤港澳协同发展理论与实践研究课题立项名单的公告

2025-08-14　　来源：十五运会组委会、残特奥会组委会

根据《关于开展十五运会和残特奥会粤港澳协同发展理论与实践研究课题申报和典型案例征集工作的通知》工作要求及安排，经公开申报、共同主办单位推荐专家评审推荐等环节，现将“十五运会和残特奥会粤港澳协同发展理论与实践研究课题”立项名单（详见附件）予以公告。相关事项通知如下。

一、纸质材料提交：经评审通过确认立项的申报人，需于8月29日之前，将课题申报书签字盖章版原件报送至十五运会和残特奥会组委会课题评审办公室。

二、课题研究期限：根据立项申请，课题结项时间为2025年11月20日。课题不设延期，结项要求详见课题申报通知。

三、成果发表注明：经认真开展研究工作，以决策咨询报告、学术论文、理论文章、著作等作为结项成果的课题组，成果发表注明为十五运会和残特奥会粤港澳协同发展理论与实践研究课题项目（编号：2025GBA-XXX）。

四、研究内容变更：课题研究应按照《课题立项申请书》的设计进行。未经十五运会和残特奥会组委会课题评审办公室审批同意，不得随意更改研究方向、内容及变更管理单位。

五、无法按期结项：未按时提交结项材料或结项材料未达到结项要求的课题主持人，将取消其十五运会和残特奥会粤港澳协同发展理论与实践课题研究资格，同时不予发放课题结项证书。

十五运会和残特奥会课题研究杜绝学术腐败，欢迎投诉。如有异议，请以书面方式向十五运会和残特奥会组委会课题评审办公室反映，并提供必要的证据材料，以便核实查证。提出异议者须提供本人真实姓名、工作单位、联系电话等有效联系方式（十五运会和残特奥会组委会课题评审办公室将依法依规予以严格保密），凡匿名、冒名或逾期的异议不予受理。

附件：十五运会和残特奥会粤港澳协同发展理论与实践研究课题立项名单

电话：020-88815923

电子邮箱：szwhllb@gd.gov.cn

粤港澳联合承办十五运会和残特奥会背景下高校体育人才培养的研究	陈素玲	广东省私立华联学院
基于岭南音乐特色与高职实践的十五运会和特残奥会对粤港澳文旅产业带动效应研究	刘　龙	广东省私立华联学院
醒狮文化赋能特殊群体社会融合的粤港澳实践研究	刘日莉	广东省私立华联学院
粤港澳联合承办十五运会和残特奥会体育精神对铸牢中华民族共同体意识效果的研究	高　增	湘潭大学
粤港澳联合承办大型体育赛事对铸牢中华民族共同体意识的效果评估和制度完善	莫　然	广东金融学院
粤港澳全运会赛事与国家认同建构研究	余　清	顺德职业技术大学
粤港澳联合承办运动会对三地文旅产业发展影响研究	彭　柳	广州华立科技职业学院
十五运会和残特奥会志愿服务工作助力大学生核心素养培育研究	朱　君	广州华立科技职业学院
粤港澳联合承办十五运会和残特奥会对国家统战大局的影响	冼晓茵	广州华立科技职业学院
粤港澳联合承办十五运会和残特奥会对中华优秀体育文化的传承与创新研究之风筝进学校对风筝文化传承促进作用的研究	林显亮	广东省阳江市第三中学
基于财务协同的十五运会和残特奥会助力粤港澳经济发展路径研究	杨廷尧	广东茂名幼儿师范专科学校
赛事文化氛围营造与粤港澳大湾区城市品牌共建研究	陈　瀚	广州美术学院
十五运会与残特奥会“赛事氛围”对三地文旅产业发展的公众感知研究	李拥军	广州美术学院
十五运会和残特奥会会徽设计理念及创作实践研究	钱　磊	广州美术学院
粤港澳十五运会与残特奥会色彩识别系统构建与实践研究	史睿生	广州美术学院
粤港澳联合承办十五运会和残特会对体育数智技术发展与治理效果的研究	王巧珍	广东工程职业技术学院
十五运会和残特奥会驱动下粤港澳体文旅融合发展的多维效应与优化路径研究	李茂华	广东海洋大学
粤港澳联合承办十五运会和残特奥会背景下体育文化与产业一体化发展模式构建研究	李　琛	广东食品药品职业学院
残特奥会仪式艺术的社会融入机制研究：基于跨文化案例之象征与认同	李　莉	广东食品药品职业学院
十五运驱动下粤港澳飞镖运动协同发展研究：基于体教融合与包容性赋能的路径创新	许　新	广东食品药品职业学院
粤港澳联合举办十五运会的语言规划对增进港澳地区国家认同效果研究	溯健聪	广州大学
融合·共享·引领：粤港澳联办全运会和残特奥会对体育强国建设的实践推动研究	梁金玉	广东培正学院
粤港澳联合承办十五运会的视觉识别系统设计对增强大湾区文化认同的理论研究	潘　沛	广州幼儿师范高等专科学校
基于AI文本挖掘技术的十五运会和残特奥会网络舆情分析——以新浪微博为例	乌日娜	华南师范大学
残特奥会背景下听力障碍运动员运动干预效益研究——以湛江市特殊学校male人足球为例	陈世修	湛江市特殊教育学校
粤港澳联合承办十五运会赋能大湾区竞技体育协同发展的路径探赜	陈立农	广州体育学院
十五运会与残特奥会背景下粤港澳国球文化协同培育机制研究	李宇星	广州体育学院
粤港澳联合承办十五运会和残特会对中华体育精神传播效果的研究	李雪婷	广州体育学院
十五运会和残特奥会赋能粤港澳体育名城建设的湾区模式研究	王庆林	广州体育学院
粤港澳联合承办15运会与残特奥会背景下中华优秀体育文化“传承为基、创新为翼”的发展路径研究	曾　红	广东东软学院
粤港澳大湾区体育培训业态跨境供给的制度壁垒实证研究	许　磊	广东东软学院
粤港澳联合承办十五运会和残特奥会对体育场馆数智技术发展与治理效果的研究	余中杰	广州体育学院
十五运会背景下粤港澳大湾区体育产业高质量发展路径研究	向长青	湖北文理学院
中华民族共同体视阈下“十五运”赛事符号的多语传播机制研究	谢俊斌	广东第二师范学院
粤港澳联合承办十五运会和残特奥会助推体育强国建设研究	陈伟华	广东第二师范学院
粤港澳联合承办十五运会和残特奥会对中华优秀体育文化的传承与创新研究	郭　谦	广东第二师范学院
十五运会和残特奥会有关内容融入小学语文与综合实践活动的跨学科教学模型研究	冯梓艺	广东第二师范学院
国家战略引领下粤港澳重大体育赛事协同治理体系现代化研究	陈艳兰	广东第二师范学院
粤港澳大湾区体育数智技术发展与治理效果的协同创新路径研究	郭晓帅	广东工程职业技术学院
粤港澳联合承办十五运会和残特奥会对赋能我国区域体育事业高质量发展路径的研究——以肇庆市封开县为例	莫永桢	肇庆市封开县江口街道中心小学南校区
十五运会和残特奥会推进人文湾区建设的价值意蕴与协同实践进路	车学森	韩山师范学院
城市品牌与文化记忆视角下十五运会对粤东地区形象重塑的影响研究	卢　谦	韩山师范学院
粤港澳联合承办十五运会与残奥会背景下小学生“以体强心”体育活动的设计、实践与成效研究——以佛山市D小学为例	欧阳慧娜	佛山市禅城区东华里小学
第十五届全运会群众体育赛事对粤港澳文旅产业协同发展的影响机制研究	苗　皓	中南财经政法大学
粤港澳联合承办十五运会和残特奥会对港澳融入国家发展大局的影响研究	徐怡瑞	广东外语外贸大学
粤港澳联合承办十五运会和残特奥会对将来三地联合承办国际活动的影响研究	鲍　雨	广州市社会科学院
大型赛会志愿者管理实践对志愿服务可持续发展的影响及机制研究——以十五运会和残特奥会广东赛区赛会志愿者为例	李海峰	华南师范大学
粤港澳大湾区老年健康服务体系构建与优质资源共享机制研究	李佳豫	广东工业大学
粤港澳协同发展视角下十五运会赛事资源赋能深圳市中职体育课堂参与度的实践探索	王焱银	深圳市沙井职业高级中学
粤港澳联合承办十五运会和残特奥会赋能粤北云浮地区体育赛事高质量发展路径研究	彭　伟	罗定职业技术学院
粤港澳联合承办十五运会和残特奥会对铸牢中华民族共同体意识效果的测量学研究	傅　佳	嘉应学院
粤港澳联合承办十五运会和残特奥会对加快推进体育强国建设的理论与实践研究	何泽洪	广州南方学院
新时期粤港澳男子100米发展机遇、挑战与前景	陈聪航	澳门理工大学
人工智能在十五运会和残特奥会中的应用价值、困境与实现路径研究	黎东宇	广州体育学院

（2）结项书

第十五届全国运动会组织委员会
全国第十二届残疾人运动会暨第九届特殊奥林匹克运动会组织委员会
全国港澳研究会
中共广东省委港澳工作办公室
广东省教育厅
广东省体育局
广东省社会科学界联合会
广东省残疾人联合会

关于十五运会和残特奥会粤港澳协同研究课题结项及典型案例征集情况的公告

根据《关于开展十五运会和残特奥会粤港澳协同发展理论与实践研究课题申报和典型案例征集工作的通知》和《关于做好十五运会和残特奥会粤港澳协同发展理论与实践研究课题结项验收工作的通知》，十五运会和残特奥会组委会课题评审办公室组织了由全国港澳研究会、中共广东省委港澳工作办公室、广东省教育厅、广东省体育局、广东省社会科学界联合会、广东省残疾人联合会等八家共同主办单位推荐的课题评审专家，对前期立项

课题的结题材料进行了验收。课题评审获“结项通过”的为491项，其中“优秀结项”95项（详见附件1）。案例评审获“典型案例”的为74项，其中“优秀案例”30项（详见附件2）。现将课题结项和案例评审结果予以公告。

附件：

1.十五运会和残特奥会粤港澳协同研究课题验收结果

2.十五运会和残特奥会粤港澳协同典型案例评审结果

第十五届全国运动会
组织委员会
港澳工作协调部
（代章）

全国第十二届残疾人运动会
暨第九届特殊奥林匹克运动会
组织委员会港澳工作协调部
（代章）

2025年12月10日

113	十五运会和残特奥会驱动下粤港澳体文旅融合发展的名誉效应与优化路径研究	李茂华	李志勇、王珠凡、马锐、陈丽薇	广东财经大学
114	残特奥会仪式艺术的社会融入机制研究：基于散文化表演之象征与认同	李 莉	许新、安英俭、李俊、黄宜荣、何平月、胡列荣	广东食品药品职业学院
115	十五运驱动下粤港澳飞镖运动协同发展研究：基于体旅融合与包容性视角的路径创新	许 新	李莉、张楷、李俊、胡列荣、何平月、陈超花	广东食品药品职业学院
116	融合·共享·引领：粤港澳联办全运会和残特奥会对体育强国建设的实践推动研究	梁金玉	钟丹、杨金强、伍法源、黎及第、高丽华、李宗协	广东培正学院
117	基于AI文本挖掘技术的十五运会和残特奥会网络舆情分析——以浙江网络学院为例	乌日娜	冯良、黄金一、程诗雨	华南师范大学
118	残特奥会背景下听力障碍运动员运动干预效能研究——以浙江市特殊学校跨人足球为例	陈世锋	陈国能、梁文、黎国林、蔡开、文崇健、邵知治	浙江市特殊教育学校
119	粤港澳联合承办十五运会赋能大湾区竞技本体协同发展的路径创新	陈立农	夏江涛、莫锦霞、陈宇、潘小雨	广州体育学院
120	粤港澳联合承办十五运会和残特会对中华体育精神传播效果的研究	李宗协	罗宏珍、叶加鹏、陈嘉言	广州体育学院
121	粤港澳联合承办15运会与残特奥会背景下中华传承体育文化“传承为基、创新为翼”的发展路径研究	曾 红	谢云、叶小俊、李伟峰、陈威、陈璐	广东东软学院
122	粤港澳联合承办十五运会和残特奥会对体育场馆智慧技术发展与治理效果的研究	余申杰	刘洋、朱家伟	广州体育学院
123	十五运会背景下粤港澳大湾区体育产业质量发展路径研究	向长市	张华红、李小强、赵洁	湖北文理学院
124	中华民族共同体视域下“十五运”赛事书写的多话传播机制研究	谢俊诚	曹广涛、柳淑芬、钟冰娟、宋晓婉	广东第二师范学院
125	粤港澳联合承办十五运会和残特奥会助推体育强国建设研究	陈伟华	张细谦、孙晨晨、吴敬	广东第二师范学院
126	十五运会和残特奥会有关内容融入小学语文与综合实践活动的跨学科教学模型研究	冯梓艺	秦志军、蔡楚雨、刘翔儿、何佳丽、谢丽晶、谢晓君	广东第二师范学院
127	粤港澳大湾区体育数智技术发展与治理效果的协同创新路径研究	郭晓静	张菊香、徐雪、王志晨、刘上茗子、王海雨、彭文迪	广东工商职业技术学院
128	粤港澳联合承办十五运会和残特奥会对赋能我国区域体育事业高质量发展路径的研究——以肇庆市封开县为例	莫水桂	韦立江、李开扶、刘家玲、钟水辉、陈健辉	肇庆市封开县江口街道中心小学南校区
129	城市品牌与文化记忆视角下十五运会对粤东地区形象重塑的影响研究	卢 波	任欣登、卢功林、黄俊生、吴振彬、余思琳、赖思含	韩山师范学院
130	粤港澳联合承办十五运会与残奥会背景下小学生“以体强心”体育活动的设计、实践与成效研究——以佛山市D小学为例	欧阳慧娜	祖品、何锐、吴晓华、任筱娟、陈浩文、黄立维、刘伯林、肖晓初	佛山市禅城区东华里小学
131	第十五届全运会群众体育赛事对粤港澳文旅产业协同发展的影响机制研究	雷 蕾	山俊秋、张婷、陈思贝、何威	中南财经政法大学
132	大型赛会志愿者管理实践对志愿服务可持续发展的影响及机制研究——以十五运会和残特奥会广东赛区赛会志愿者为例	李超峰	吴华球、史薇伟、朱晓梦、吴茜、丁茜	华南师范大学
133	粤港澳大湾区老年健康服务体系构建与发展评测共享机制研究	李佳璇	何文义、张雅发、潘玥、朱俊锋、高佳佳、朱振远、魏新颖	广东工业大学
134	粤港澳协同发展视角下十五运会赛事资源赋能深圳市中职体育课堂参与度的实践探索	王格思	周东、李晋山	深圳市沙井职业高级中学
135	粤港澳联合承办十五运会和残特奥会赋能粤北运动区体育竞赛高质量发展路径研究	彭 伟	李忠山、陈金锦、李海军、金海明、欧旭洲	罗定职业技术学院
136	粤港澳联合承办十五运会和残特奥会对提高中华民族共同体意识效果的调查与研究	傅 艳	赖锦荔、张长城、江广和、陈三跃、谢国扬、沈亚丽	嘉应学院
137	粤港澳联合承办十五运会和残特奥会对加快推进本省强国建设的理论与实践研究	何泽洪	何瑞梅、郭小强、温雅怀	广州南方学院
138	人工智能在十五运会和残特奥会中的应用价值、限域与实现路径研究	黎东宇	梁 坤、李兴鹏、肖加付、魏 扬、田俊去、肖新宇、温嘉杰、吕汝钧、姚嘉伟、余淑荣	广州体育学院
139	十五运会和残特奥会的举办对三旅文旅产业发展影响研究	曾奕芬	任淑颖、张蓉平、郑晓茭、吴琪	广东农工商职业技术学院
140	短视频平台传播下十五运会赛事内容对粤港澳大学生体育价值观的影响路径研究	吕 雪	令狐、王林、柳颖、刘俊平、王奕琳、曾奕芬、李虹云	广东农工商职业技术学院
141	粤港澳大湾区体育活动对港澳青少年国家认同的促进研究	王 翔	朱宏超、郭晓明、吕立、谭达鹏、陈晓菲、马程浩、曾燕梅	广东农工商职业技术学院
142	粤港澳联合承办十五运会和残特奥会背景下高校共击团队服务的协同机制与育人价值探究	朱亚星	李晓超、马妍、刘洋、卢瑶、李强	广东农工商职业技术学院
143	残健共融理念下华体育精神的港区表达与传播效果研究	罗 潇	邓雪凤、尹浩军、欧娜、郑丽红、王广进	电子科技大学中山学院
144	粤港澳联合承办十五运会和残特奥会增强港澳青少年国家认同的机制与路径研究	夏永锐	王诗超、李浩、孙欣欣、钟丽超、吴孝儿	广州体育学院
145	“创美学视域下粤港澳十五运会和残特奥会体育展示资采协同推进文化认同构建研究	王 欣	王子慧、刘小雷、何轩旭	广州体育学院
146	十五运会和残特奥会赋能粤港澳高校联席中华民族共同体意识路径研究	黄艳琪	郭婷婷、朱娟、蔡小雨、郑丽秀、李运兴、张细文	广东江门中医药职业学院
147	残特奥会文化赋能听障校园学生体质增强的行动研究	曹城峰	何平、梁晓娟、陈丽、陈永宏、林海涛	广州市启聪学校（广州实验教育集团花城实验学校）
148	粤港澳联合承办十五运会和残特奥会群中身体育精神传播效果的研究	左海鹏	吴晓聪、夏江涛、伍勇、罗宏、胡天弟	深圳大学
149	“十五运”背景下粤港澳大湾体育赛事主播协同机制优化研究	杜艳艳	王晓东、崔俊敏、廖慧平、王京源、肖卓明、林立	广州体育学院
150	“十五运”背景下粤港澳传承中医传统体育功法文化的实践探索	曹荣俊	刘刚、郑健、杨静、卞伯高、朱丽艺、魏家慕	广州中医药大学
151	粤港澳联合承办十五运会和残特奥会对环南部湾协同发展的影响研究	任法璐	法丽娜、张开凤、李振冰、李依仪、张俊昕、李晓恒	广东轻工职业技术大学
152	十五运及残特奥会对粤港澳三地协同促进积极老龄化体育行为的作用机制研究	法丽娜	陈淑玲、任法璐、李志坚、刘佳、李依仪、张俊昕、吴亦浙	广东轻工职业技术大学
153	粤港澳联合承办十五运会和残特奥会中华优元家庭示范区域文化认同凝聚的影响机制研究	尹 怡	黄安霞、张晓璇、李志红	广东轻工职业技术大学
154	借势全运：粤港澳大湾区马拉松“赛事—产业—社群”协同发展研究	林 鹏	陈福波、罗凯、朱旭、刘晓民、陈燕开、付冬平、黄丹	广东轻工职业技术大学
155	十五运会和残特奥会服务效能优化：基于赛事志愿者利他行为的驱动机制研究	高 涛	简可、张帅锋、王玉洁、崔淑波	广东轻工职业技术大学
156	十五运会和残特奥会背景下粤港澳体育产业“体育+”与“+体育”融合发展的消费新业态培育研究	史悦君	黎良友、郑晓雯、李青	广州南方学院
157	粤港澳联合承办十五运会和残特奥会对辖军中老民共同体意识效果的研究	崔玉改	张作兵、翟月伟	油田职业技术学院
158	粤港澳联合承办十五运会和残特奥会对辖军中老民共同体意识效果的研究	谢阳淑	欧阳逸贤、易云婷	广州南方学院
159	“十五运会和残特奥会”的统战功能及其对台工作的贡献探讨	王 鑫	无	广州南方学院
160	从赛场到田间：粤港澳高职联合培养“乡村振兴体育指导员”的模式研究	谢月亮	彭彬、张嘉鑫、李荣兵、郭斌、刘文、何鑫	广东轻工职业技术学院
161	粤港澳联合承办十五运会背景下新兴运动发展模式与区域融合路径研究	陈玉花	张兴林、双福、夏力	广州体育学院
162	粤港澳联合承办十五运会和残奥会对联德里区域体育职业高质量发展路径的研究	张绍华	李志辉	广州市培英中学
163	粤港澳联合承办十五运会和残特奥会中的中华体育精神在体育教学中实践应用的研究	许小云	梁东芬、王相雨、林燕珍、石华明、夏才悦	江门市蓬江区荷塘镇沙仔小学
164	关于在备战十五运期间科技助力专业足球队的研究	宋 驰	无	广东省足球运动中心
165	运动干预康复效果视角下中老年关节痛的“四维协同”粤港澳社区运动康复联动管理服务模式研究	叶翔翔	陈安、潘晓娜、刘爱娟、夏文山、刘海丰	中山火炬职业技术学院
166	音乐智慧测评对轮椅篮球运动员情绪调动及竞赛状态干预研究	杨晓琛	陈琦、于慧荣、赵伟、刘尚文	韶关学院
167	十五运会和残特奥会驱动的粤港澳体育资格互认协同治理路径研究	翁文锋	刘俊福、胡柏	广东职业技术学院
168	基于碎片化运动的粤港澳地区积极老龄化与体重管理策略研究	邓瑞卿	文冬生、杨阳、张文娟、翁文锦、武传钟	广州商学院
169	睡眠障碍老年人体质健康与身体机能动态评估及体育锻炼干预的健康效应研究	杨 超	谢飞扬、布乃峰、庄妮、陈静、王雪	广州商学院
170	双赛事催化粤港澳体育经济一体化协同创新与制度适配研究	蒋文锋	王丽丽、何明芳、吴雪莉、杨广萍	广州商学院
171	粤港澳联合承办十五运会和残特奥会驱动新场景重塑老下体育社会组织活英与建设研究	刘盛艳	白思文、李欣阳、严城彬	广州商学院
172	粤港澳联合承办十五运会和残特奥会对新场景重塑老下体育社会组织活英与建设研究	史梦怡	徐震、Michael Hu、李婉雯、张欣雯、吴文捷	广州商学院
173	双赛事驱动粤港澳文旅体产业协同发展的创新机制与实践路径研究	王丽霞	莫丽英、崔慧、蒋文锋、张芳、张雅琪、陈雪	广州商学院
174	粤港澳联合承办十五运会背景下解蒋文化传承与创新路径研究	叶剑光	肖锦也、罗沛、欧阳娜、王宁、朱贺冰、李嘉欣、张伟伟	广州商学院
175	从体到到共创：积极老龄化背景下沉浸式艺术赋能粤港澳社区体育文化参与的实践路径研究	赵 宁	程潮、张金兰、郑娜、杨伟伟、李可昊、王睿	广州商学院
176	“一带三地”的协同实践：十五运会视角机制在粤港澳视频新技术中的赋能路径研究	周乐韵	廖思、李丽儿	广州商学院

（3）部分申请书

附件 2

课题指南序号	

十五运会和残特奥会粤港澳协同发展理论与实践研究
课题立项申请书

课 题 名 称 粤港澳联合承办十五运会和残特奥会对体育场馆数智技术发展与治理效果的研究

课 题 主 持 人 余中杰

主持人所在单位 广州体育学院

填 表 日 期 2025 年 7 月 22 日

十五运会和残特奥会组委会课题评审办公室

2025 年 6 月

— 1 —

<table>
<tr><td colspan="2">课题名称</td><td colspan="8">粤港澳联合承办十五运会和残特奥会对体育场馆数智技术发展与治理效果的研究</td></tr>
<tr><td rowspan="5">课题主持人情况</td><td>姓名</td><td>余中杰</td><td>性别</td><td>男</td><td>民族</td><td>汉族</td><td>出生年月</td><td>1990年1月</td></tr>
<tr><td>行政职务</td><td>基建科科长</td><td>专业职称</td><td>工程师</td><td>最高学历</td><td>硕士研究生</td><td>研究专长</td><td>体育场馆建设运营</td></tr>
<tr><td>移动电话</td><td colspan="3">17576082000</td><td>电子邮箱</td><td colspan="3">yuzj@gzsport.edu.cn</td></tr>
<tr><td>工作单位</td><td colspan="7">广州体育学院</td></tr>
<tr><td>邮寄地址</td><td colspan="7">广东省广州市广州大道中1268号</td></tr>
<tr><td rowspan="5">课题组成员情况</td><td>姓名</td><td>出生年月</td><td>专业职称</td><td>学历学位</td><td>工作单位</td><td>研究专长</td><td colspan="2">本人签名</td></tr>
<tr><td>刘洋</td><td>1989年11月</td><td>图书馆馆员</td><td>硕士研究生</td><td>华南农业大学</td><td>公共政策</td><td colspan="2">刘洋</td></tr>
<tr><td>朱家伟</td><td>1972年10月</td><td>副教授（博导）</td><td>博士研究生</td><td>澳门城市大学</td><td>数据科学分析</td><td colspan="2">朱家伟</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">是否保证如期完成</td><td colspan="8">☑是　　☐否</td></tr>
<tr><td colspan="2">研究类型</td><td colspan="8">☑应用研究　　☐基础研究</td></tr>
<tr><td colspan="2">预期成果</td><td colspan="8">☐论文 ☐理论文章 ☐咨询报告 ☐专著 ☑研究报告</td></tr>
</table>

课题主持人所在单位意见（高校须科研部门）： 同意申报 负责人签名： 公章 2025年7月23日
课题评审办公室意见： 十五运会和残特奥会组委会 课题评审办公室 （盖章处） 年　　月　　日

2.2.2 基于全寿命周期绿色体育场馆建设管理的研究(C 类)

（1）立项书

广 东 省 教 育 厅

粤教科函〔2020〕6 号

广东省教育厅关于公布 2020 年度普通高校认定类科研项目立项名单的通知

各有关高校:

为深入实施创新驱动发展战略，落实《广东省教育厅 广东省科学技术厅关于印发科教融合协同推进高校科技创新能力提升工作计划的通知》（粤教科函〔2019〕57 号），2020 年省教育厅结合“创新强校工程”组织开展科研项目认定工作。经学校评审、省教育厅组织审核，现将通过认定方式批准立项的 2020 年度特色创新和青年创新人才科研项目立项名单（见附件）下达各高校。

请各高校按照《广东省高等教育“创新强校工程”专项资金管理办法》（粤财教〔2014〕130 号）及相关科研平台项目管理办法，统筹安排项目资金，加强资金管理，督促项目承担人按照项目申请书开展建设工作，协助解决项目实施过程中遇到的困难和问题，确保研究项目如期完成目标任务。

序号	项目编号	项目名称	负责人姓名	所属学校
38	2020WQNCX038	20世纪30-60年代纽约知识分子的大众文化观念研究	缪斯	广州美术学院
39	2020WQNCX039	基于多模态交互的博物馆数字叙事研究	余胜钊	广州美术学院
40	2020WQNCX040	基于全寿命周期绿色体育场馆建设管理的研究	余中杰	广州体育学院
41	2020WQNCX041	当代电竞纪录片叙事模式研究	李鹏	广州体育学院
42	2020WQNCX042	虚拟仿真实验在网球课程中的应用研究—以网球裁判教学为例	张光富	广州体育学院
43	2020WQNCX043	课语整合式学习的理论与实践研究	李灵丽	广东技术师范大学
44	2020WQNCX044	精准扶贫视域下广东省贫困地区生态旅游政策保障机制研究	于钧泓	广东技术师范大学
45	2020WQNCX045	受贿犯罪所得之没收研究	吴岳檎	广东技术师范大学
46	2020WQNCX046	粤西服饰文创产品孵化平台的建设与研究	曹丹	岭南师范学院
47	2020WQNCX047	劳动者组织在促进工会灵活就业中的功能定位和实践路径研究	王征	岭南师范学院
48	2020WQNCX048	潮汕传统武术文化遗产挖掘、整理研究	胡宏东	韩山师范学院
49	2020WQNCX049	财务管理视角下广东2020年后农村脱贫长效机制研究——以潮州市为例	林珊微	韩山师范学院
50	2020WQNCX050	教师发展视域下青年外语教师践行专业自主的路向研究	张琪	韩山师范学院
51	2020WQNCX051	科技金融对普惠金融的影响及空间溢出效应研究——以广东省为例	吴肇霖	韩山师范学院
52	2020WQNCX052	基于大数据的典型城市房价预测研究	周亮锦	韩山师范学院
53	2020WQNCX053	乡村振兴背景下地方文化精英对传统村落保护的影响研究	龚庆芳	广东金融学院

（2）结项书



结项证书

项目类别：广东省普通高校青年创新人才类项目（人文社科）

批 准 号：2020WQNCX040

学校名称：广州体育学院

项目名称：基于全寿命周期绿色体育场馆建设管理的研究

负 责 人：余中杰

课题组成员：刘洋 林梦师 李文强 孙希洋

证 书 号：202420WT014

该项目经审核，准予结项。

广东省教育厅科研处

二〇二四年六月

（3）部分申请书

版本号：002

广东省普通高校青年创新人才类项目

申报书(哲学社会科学)

项 目 类 别：青年创新人才类项目（人文社科）

项 目 名 称：基于全寿命周期绿色体育场馆建设管理的研究

学 科 分 类：体育科学

项目负责人：余中杰

负责人手机：17576082000

所 在 学 校：广州体育学院(盖章)

广东省教育厅制
二〇二〇年六月

基本信息

项目信息	项目名称	基于全寿命周期绿色体育场馆建设管理的研究			
	项目类别	青年创新人才类项目（人文社科）			
	研究类型	应用研究	申请金额	2(万元)	
	学科一	体育科学 - 体育管理学			
	学科二	管理学 - 管理工程			
	学科三				
	计划开始日期	2020.8	计划完成日期	2022.8	
	所属学校	广州体育学院	学校类型	硕士授权高校	
	预期成果形式	论文			

合作单位	合作单位名称	联系人	联系电话	通讯地址

负责人信息	姓　名	余中杰	性　别	男	民　族	汉族
	出生年月	1990.1	学　历	研究生	学　位	硕士
	职　称	中级		职　务	工程师	
	办公电话	020-38027670		手　机	17576082000	
	一级学科	管理学		二级学科	管理工程	
	电子邮件	64825022@qq.com		身份证号	44010319900113421X	
	人才层次					
	研究专长	体育管理学、管理科学与工程、结构工程、土木工程				

摘要	本课题是基于全寿命周期绿色体育场馆建设管理的研究。主要针对体育场馆存在的问题，分析问题的原因和解决问题的重点和难点，研究基于全寿命周期绿色体育场馆建设管理的措施。结合能源监控系统，系统性数据分析体育场馆能耗状况，研究具有可行性的改造措施。
关键字	全寿命周期，体育场馆，可持续发展，建设管理

项目组成员

总数（含负责人）		高级		中级	初级	博士	硕士	学士
5		0		5	0	2	3	0
姓名	性别	出生年月	学位	职称	项目分工	工作单位		研究领域
刘洋	女	1989.11	硕士	中级	文献检索、资料分析	华南农业大学		文献检索、管理学
林梦师	女	1990.4	硕士	中级	外文翻译	广州体育总会		商务英语
李文强	男	1989.10	博士	中级	绿色材料分析	广州体育学院		材料学
孙希洋	男	1989.1	博士	中级	查补成果	广州体育学院		传媒学

签字和盖章页(此页自动生成，打印后签字盖章，上传扫描件)

申请者：　　余中杰　　依托单位：　　广州体育学院

项目名称：　　基于全寿命周期绿色体育场馆建设管理的研究

申请者承诺：

本人符合各项申报条件，本表各项内容真实、数据准确，不涉密，没有知识产权争议。如果获准立项，承诺以本表为有约束力协议，遵守有关规定，按计划认真开展研究工作，取得预期研究成果，并按时报送有关材料。若填报失实和违反规定，本人将承担全部责任。

签字：

项目组主要成员承诺：

本人保证有关申报内容的真实性。本人将严格遵守广东省教育厅的有关规定，切实保证研究工作时间，加强合作、信息资源共享，认真开展工作，及时向负责人报送有关材料。若个人信息失实、执行项目中违反规定，本人将承担相关责任。

编号	姓名	工作单位	分工	签名
1	刘洋	华南农业大学	文献检索、资料分析	
2	林梦师	广州体育总会	外文翻译	
3	李文强	广州体育学院	绿色材料分析	
4	孙希洋	广州体育学院	查补成果	

依托单位和合作单位承诺

已按填报说明对申请人的资格和申请书内容进行了审核，本单位保证对研究计划实施所需要的人力、物力和工作时间等条件给予保障，严格遵守广东省教育厅有关规定，督促负责人和主要成员以及本单位科研管理部门按照广东省教育厅的规定及时报送有关材料。

	依托单位	合作单位 1	合作单位 2
单位名称	广州体育学院（公章）	（公章）	（公章）
承诺经费	2（万元）	（万元）	（万元）
日期：	年　月　日	年　月　日	年　月　日

三、科研成果

3.1 学术论文

3.1.1.检索证明

SCAULIB202625448

检索证明

根据委托人提供的论文材料，委托人华南农业大学图书馆 刘洋(学科类型:人文社科) 6 篇论文收录情况如下表。

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	Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking	INFORMATION DEVELOPMENT 出版年：2025 出版日期：JUN 2 卷期： 页码： 文献类型：Article, Early Access	第一作者	B类	华南农业大学图书馆	SSCI	IF2-year=2.1 IF5-year=2.3 (2024)	管理学 4区 Top期刊：否 OA期刊：否 (2025)
2	The Health Risks of Information Avoidance: A RISP Perspective	LIBRI-INTERNATIONAL JOURNAL OF LIBRARIES AND INFORMATION STUDIES 出版年：2025 出版日期：SEP 25 卷期：75 3 页码：219-234 文献类型：Article	第一作者	B类	华南农业大学图书馆	SSCI	IF2-year=0.8 IF5-year=0.9 (2024)	管理学 4区 Top期刊：否 OA期刊：否 (2025)
3	Global Cassava Germplasm Resources: Industrial and Technological Development	FOOD AND ENERGY SECURITY 出版年：2025 出版日期：SEP 18 卷期：14 5 页码：- 文献号：e70131	共同第一作者	A类	华南农业大学图书馆	SCI	IF2-year=4.5 IF5-year=5.4 (2024)	农林科学 2区 Top期刊：否 OA期刊：是 (2025)

第 1 页/共 3 页

		文献类型：Review						
4	高价值专利指标探讨——基于中国金奖专利的实证分析	中国高校科技 出版年：2021 出版日期：2021-08-20 卷期： 08 页码：80-84 文献号： 文献类型：期刊论文	第一作者	C 类	华南农业大学图书馆	北大核心	无	无
5	高校图书馆知识产权信息服务绩效评价指标体系构建——以 60 所高校知识产权信息服务中心为例	中国高校科技 出版年：2024 出版日期：2024-04-25 卷期： 04 页码：100-106 文献号： 文献类型：期刊论文	第一作者	普刊类	华南农业大学图书馆	CNKI	无	无
6	新媒体时代高校网络舆情演化机理及对策研究	大学教育 出版年：2024 出版日期：2024-01-01 卷期： 01 页码：8-13 文献号： 文献类型：期刊论文	第一作者	普刊类	华南农业大学图书馆	CNKI	无	无

说明：论文等级和中科院大类分区按《华南农业大学学术论文评价方案（试行）》划分。

报告免责声明:如未盖章,报告无效

检索员：刘汉忠

SCAULIB202625766

检索证明

根据委托人提供的论文材料，委托人华南农业大学图书馆 刘洋(学科类型:人文社科) 2 篇论文收录情况如下表。

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	基于交互式在线教育平台应用的混合教学模式探究——以文献检索课为例	韶关学院学报 出版年：2022 出版日期：2022-02-15 卷期：43 02 页码：- 文献号： 文献类型：期刊论文	第一作者	普刊类	华南农业大学图书馆	CNKI	无	无
2	理性网络信息观与信息传播自律	传媒论坛 出版年：2024 出版日期：2024-09-25 卷期：7 18 页码：- 文献号： 文献类型：期刊论文	通讯作者	普刊类	华南农业大学图书馆	CNKI	无	无

说明：论文等级和中科院大类分区按《华南农业大学学术论文评价方案（试行）》划分。

报告免责声明:如未盖章,报告无效

检索员：尹银林

华南农业大学图书馆

3.1.2.以第一作者发表本专业论文情况（B 类 2 篇，A 类 1 篇，C 类 1 篇）

(1) Factors influencing artificial intelligence (AD) literacy in the age of generative Al chatbots forhealth information seeking (B 类)

Check for updates

Original Manuscript

Information Development
1–18
© The Author(s) 2025
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/02666669251343030
journals.sagepub.com/home/idv
Sage

Factors influencing artificial intelligence (AI) literacy in the age of generative AI chatbots for health information seeking

Yang Liu
Library, South China Agricultural University, Guangzhou, China;
Faculty of Data Science, City University of Macau, Macau, China

Ying-Yueh Su
Department of Textiles and Clothing, College of Textiles and Clothing, Fu Jen Catholic University, New Taipei City

Anas Ali Alhur
Department of Health Informatics, College of Public Health and Health Informatics, University of Hail, Hail, Saudi Arabia

Salman Bin Naeem
Department of Information Management, The Islamia University of Bahawalpur, Bahawalpur, Pakistan

Abstract
Artificial intelligence (AI) literacy plays a significant role in effectively communicating with AI generative chatbots for seeking health information or advice, as well as communicating with healthcare professionals and public health officials. The study aims to identify the factors influencing AI literacy and its subsequent influence on consumers' behavioral intentions toward seeking health information using generative AI chatbots. A nine-factor measurement model (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, AIC) was developed with the help of the Theory of Planned Behavior (TPB) and tested using structural equation modeling. The results of SEM analysis demonstrate that IFO ($\beta = 0.138$, CR = 2.731, $p < .05$), ANX ($\beta = 0.175$, CR = 3.103, $p < .05$), and AVD ($\beta = 0.158$, CR = 3.855, $p < .05$) had a statistically positive significant influence on AI literacy. Similarly, BI ($\beta = 0.128$, CR = 2.423, $p < .05$) had a statistically positive significant influence on AIC. A positive but non-significant effect of INS on AIL was also observed ($\beta = 0.058$, CR = 1.006, $p > .05$). AIL also had a positive but non-significant effect on BI ($\beta = 0.050$, CR = 1.598, $p > .05$). Additionally, the results of model fit indices show adequate model fit values: $\chi 2 = 1.679$ DF = 1867; $p = .000$; IFI = 0.954; TLI = 0.951; CFI = 0.953; RMSEA = 0.031. The findings conclude that information overload, anxiety, and avoidance significantly influence AI literacy. On the other hand, information source exposure, AI hallucination, and information seeking do not significantly influence consumers' AI literacy level. The study suggests that health professionals and staff could be equipped with better knowledge and skills related to AI applications in healthcare settings.

Keywords
artificial intelligence, AI literacy, AI competency, health information, theory of planned behavior, health consumers

Submitted: 2 January 2025; accepted: 2 May 2025

Introduction

Artificial intelligence (AI) is steeping every walk of life and is gradually being used as a tool in various

Corresponding author:
Ying-Yueh Su, Department of Textiles and Clothing, College of Textiles and Clothing, Fu Jen Catholic University, New Taipei City.
Email: 091259@mail.fju.edu.tw

fields and contexts, such as teaching and learning, science and technology, marketing, and healthcare. It adheres to a collection of skills that help an individual to evaluate analytically, collaborate, and communicate efficiently with AI tools and technologies (Chander et al., 2022). It holds incredible potential for improving healthcare services and treatment. It also offers opportunities to rectify physicians' errors and provide guidance to health staff and professionals in providing health services (Lee and Yoon, 2021). Over time, there has been continuous improvement in AI tools and technologies, which has brought substantial revaluation in healthcare settings in the form of reading images, X-rays, and MRI scans; investigating health issues; and developing health safety protocols (Lekadir et al., 2021). Numerous AI-powered applications in healthcare and medicine, such as mental health apps, wearable devices, and telemedicine, allow consumers to assess their health status (Bhatt et al., 2022). It has reformed the healthcare industry by providing parallel options for enhancing the decision-making process, patient management, treatment, and upgrading health infrastructure and research services (Guo and Li, 2018).

AI literacy empowers health consumers, equips health professionals, and enables patients to make informed health decisions about their health management and treatment options (Ai, 2023; Chen and Decary, 2020). It helps them to embrace transformations, identify the key benefits and risks associated with AI innovations, and dynamically contribute to shaping the future of the healthcare industry. AI literacy is becoming an essential competency in transforming how health information is generated, disseminated, and understood. It requires a strong foundation in health information literacy (Ali and Mughari, 2024; Coskun et al., 2024). It encompasses a wide range of literacies to designate a specific technological system, e.g., 'digital literacy,' 'media literacy,' and 'technological literacy,' and the most advanced, 'data literacy' (Bravo et al., 2021; Familoni and Onyebuchi, 2024; Koltay, 2017; Risteska, 2023). Issues of algorithm bias and accountability raise ethical concerns that influence individuals' health behavior when interpreting AI-generated health information from chatbots (Adegboye, 2024). AI literacy empowers individuals to identify and access accurate, trustworthy, and reliable health information from AI models and chatbots (Zhang et al., 2020). AI literacy enhances consumers' health information-seeking behaviors while reducing avoidance of health information and services (Soroya et al., 2024). AI proficiency positively influences health behavior and is associated with improved health decision-making. For example, individuals with higher technological skills experience lower AI anxiety and can more effectively evaluate health information from chatbots (Markus et al., 2024). Moreover, AI literacy helps individuals understand the limitations and biases of AI-generated text and images, enabling them to critically assess health information (Southworth et al., 2023).

Health organizations and departments have acknowledged the significance of AI education programs in primary and secondary healthcare settings that enable consumers to seek health information from generative AI chatbots (Platt et al., 2024). In addition, AI policies have been issued and circulated by the National Artificial Intelligence Initiative Office in the United states in 2021 (Bouanna et al., 2020), in China (Elias, 2021) by the Ministry of Education in 2019, and in Germany (Hälterlein, 2024) by the Federal Ministry of Education and Research. Moreover, there are government-based funded programs in Finland, like 'AI element,' which intend to empower AI proficiency for low-skilled and non-experts consumers (Abetti, 2004). Additionally, several projects have focused on AI education in healthcare for the general population. These initiatives aim to reach individuals from non-technological fields such as social sciences, medical sciences, education, and business administration (Wahl et al., 2018).

Artificial intelligence (AI) is transforming healthcare by enhancing diagnostics, treatment planning, and patient engagement (Lee and Yoon, 2021). However, its efficacy depends on users' ability to critically evaluate AI-generated health information; a competency termed AI literacy (Kajiwara and Kawabata, 2024; Ng et al., 2021). With the rise of generative AI chatbots (e.g., ChatGPT, Gemini) for health information seeking, empirical evidence underscores the urgency of understanding AI literacy's determinants. Studies show that 72% of users struggle to discern accurate health advice from AI chatbots due to algorithmic biases and hallucinations (Wu et al., 2024; Zhang and Kamel Boulos, 2023). Misinterpretations can lead to harmful behaviors, including treatment delays or self-diagnosis errors (Bhatt et al., 2022). Anxiety and information overload reduce trust in AI tools, with 58% of users avoiding

AI-generated health advice despite its accessibility (Markus et al., 2024; Soroya et al., 2024; Zhang and Kamel Boulos, 2023). Such avoidance exacerbates health disparities, particularly among low-literacy populations (Dzangare and Gulu, 2025; Markus et al., 2024). While governments mandate AI education programs, fewer programs target healthcare contexts, leaving consumers unprepared to navigate AI's limitations (Kajiwara and Kawabata, 2024; Platt et al., 2024; Southworth et al., 2023). The present study addresses these gaps by empirically testing a nine-factor model (e.g., information overload, anxiety, avoidance) grounded in the Theory of Planned Behavior (TPB).

The study is significant in terms of improving AI-assisted health-related informed decision-making, enhancing AI literacy and trust among consumers, and informing educational interventions to improve the general health consumer's understanding of AI limitations. Moreover, insights into user behavior can shape ethical guidelines for AI developers and ensure responsible deployment in healthcare contexts. Therefore, the present study is conducted with the following objectives:

Objectives of the study

To measure and validate the Theory of Planned Behavior (TPB) and explore the factors influencing AI literacy and its subsequent influence on consumers' behavioral intention for health information-seeking using AI generative chatbots.

Theoretical framework and development of hypothesis

Several frameworks have been reported in the literature to examine consumers' information behavior. These models or theories include the Comprehensive Model of Information Seeking (CMIS), given by Johnson and Meischke (1993), which is a well-cited framework in the domain of information behavior, particularly health behaviors (Johnson and Meischke, 1993). The CMIS focuses on health information-seeking pathways through its core constructs, i.e., information needs, seeking, and information sources. The Stimulus-Organism-Response (SOR) theory focuses on environmental triggers of behavior through stimuli (e.g., information), emotional/cognitive states, and behavioral responses (Mehrabian and Russell, 1974). The Risk Information Seeking and Processing (RISP) model focuses on how risk motivates information behavior through measuring risk perception and information-seeking behavior. It ignores emotional responses (e.g., information anxiety) (Griffin et al., 1999). The Health Belief Model (HBM) focuses on how individuals perceive and act upon health-related threats. The core constructs of HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Abraham and Sheeran, 2005).

The Theory of Planned Behavior (TPB) has been widely employed to assess consumers' information-related behaviors. It focuses on predicting intention/behavior based on rational appraisal. The TPB posits that behavioral intention is shaped by attitudes toward behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). Previous studies have successfully applied the TPB to understand information-seeking and sharing behaviors (Austvoll-Dahlgren et al., 2012; Feng et al., 2021; Malik et al., 2023; Nguyen et al., 2019). Building on the foundation of previous research studies and addressing the gaps in AI context such as the lack of constructs for AI-specific risks (e.g., hallucinations) and competencies (e.g., AI literacy), the authors have attempted to extend the TPB framework by incorporating constructs, i.e., AI hallucination, information avoidance, and AI literacy under "perceived behavioral control." The framework (Figure 1) also integrates traditional information-related constructs into the TPB's core dimensions, e.g., information seeking and information overload, which were categorized under "attitude toward the behavior." The construct of exposure to information sources was related to the dimension of "subject norms." This adaptation results in a nine-factor measurement model, comprising information seeking, exposure to information sources, information overload, information anxiety, information avoidance, AI hallucination, AI literacy, behavioral intention, and AI chatbot use (as shown in Figure 1, Table 1).

The theoretical framework is significant as it aims to bridge the gap between traditional information-behavior theories (TPB, CMIS, and RISP) and AI-driven health information behaviors by incorporating AI-specific constructs. It systematizes the evolution from traditional information-behavior theories to our AI-adapted framework. While TPB, CMIS, and RISP explain general health information behaviors, they overlook AI-specific phenomena—such as hallucinations (false outputs), literacy gaps, and passive exposure to algorithmic content. By integrating these

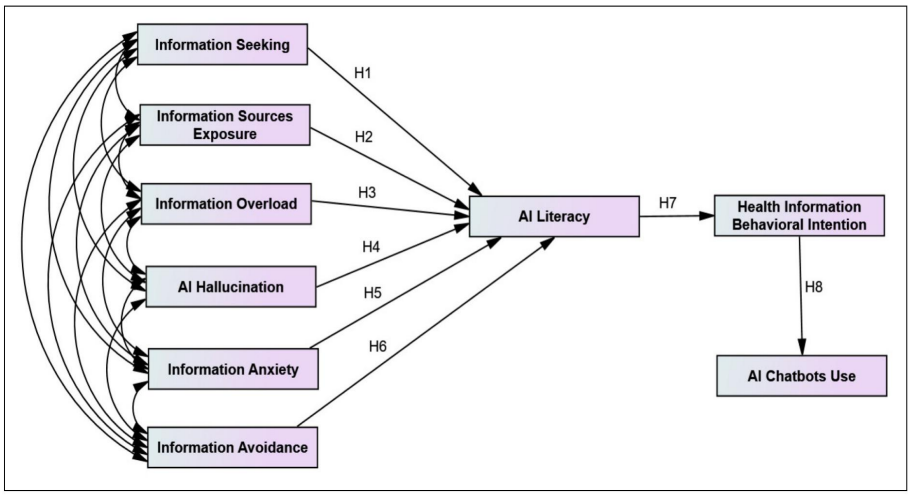


Figure 1. Conceptual framework based on the theory of planned behavior (TPB).

Table 1. Definition of constructs.

Construct	Definition	Example
Health Information Seeking	Active search for health information to address a need or uncertainty.	Health consumers intentionally query an AI chatbot (e.g., "What are the symptoms of diabetes?") to obtain health information.
Health Information Source Exposure	Passive or incidental encounter with health information without actively seeking it.	A chatbot proactively provides health tips or warnings (e.g., "Did you know about flu season risks?") without the user asking.
Information Overload	Feeling overwhelmed by excessive, complex, or conflicting information.	A chatbot provides too much technical information in response to a simple query, making it hard to process.
Information Anxiety	Stress or worry caused by seeking or encountering information.	A user becomes anxious after a chatbot lists severe but rare side effects of a medication they are taking.
Information Avoidance	Deliberate avoidance of information due to fear or discomfort.	A user avoids using a medical chatbot despite having symptoms, fearing a serious diagnosis.
AI Hallucination	AI generates false, misleading, or fabricated information confidently.	A chatbot inaccurately claims a certain herb "cures cancer" when no such evidence exists.

constructs into TPB's dimensions (e.g., AI hallucination as a perceived control barrier), the researchers advance knowledge in terms of AI-driven dimensions (e.g., AI hallucination, AI literacy), which is absent in prior models, addressing how AI's technical flaws alter behavior.

- Seeking vs. Exposure: Seeking is active, while exposure is passive.
- Overload vs. Anxiety: Overload is about information quantity, while anxiety is an emotional response.
- Avoidance vs. Seeking: Avoidance is not engaging with information, while seeking is actively searching.
- AI Hallucination: Unique to AI, where responses are factually incorrect but presented as true.

Information seeking and AI literacy. Health consumers can now easily access necessary information about their health using AI generative tools such as chatbots and virtual assistants. But as their reliance on these tools grows, they must also learn the limitations of

these tools as well as improve their capabilities for using them (Shahsavar and Choudhury, 2023a). AI-generated personalization has provided a strong awareness about AI works and possible assistance (Pataranutaporn et al., 2021). A lot of health-related information is available on the Internet, including information generated by AI tools; users need to verify the information critically. This requires critical skills to analyze the authenticity of sources, categorize preferences, and differentiate between actual and fake information (Cooke, 2017). Understanding the boundaries of health-related AI-generated tools, like predilections in programming or the need to have insights on human errors, encourages the development of critical methods for managing information (Russell et al., 2023). Health consumers use different healthcare applications and platforms to better understand data privacy policies and security concerns. This understanding also empowers ethical considerations when using AI generative tools (Okonji et al., 2024). As a result, AI literacy has a positive correlation with seeking health information from generative AI chatbots. Thus, the researchers proposed the following hypothesis:

H_1. Information seeking is positively correlated with AI literacy level poses by health consumers.

Information sources exposure and AI literacy. Individuals mostly explored health information from AI chatbots and tried to understand exposure to health information sources that may help in raising the awareness of different AI medical apps like diagnosis, cure, and humanized medication (Nadarzynski et al., 2019). People utilize health information sources to gain knowledge about the use of AI generative healthcare applications. This helps them to understand the positive and negative aspects of using these apps, and it also enables them to use these applications in an effective and critical way (Li et al., 2024). People sometimes think critically while using AI healthcare applications because regular use helps them understand the biases and limitations of these AI generative applications (Sai et al., 2024). It also becomes very difficult to build user trust in AI generative tools due to the widespread dissemination of negative and false information about AI generative applications. This is a major threat to AI generative applications because most health consumers are hesitant to rely on these applications for seeking health information due to perceived negative consequences, as well as their low level of AI and health literacy (Berkman et al., 2011; Kang et al., 2023). Therefore, the following hypothesis was formulated:

H_2. Information sources exposure is positively correlated with AI literacy level poses by health consumers.

Information overload and AI literacy. The instant sharing of health information, powered by innovative AI tools, has a significant influence on health consumers' capability to understand the use of healthcare applications of artificial intelligence (Stenzl et al., 2022). AI generative applications provide excessive information about health, and users face difficulties in making decisions regarding their health and whether they should consult these AI apps or not (Shahrzadi et al., 2024). Thus, the information overload presented by the AI tools adds more questions instead of answers, as AI results are also determined by the searching skills of the consumers. This also creates a problem that some consumers rely solely on these applications and find inaccurate information, which may cause health anxiety and serious damage to their health (Stenzl et al., 2024). Misinformation regarding health is likely to mislead health consumers, which is frequently intensified by social media algorithms (Nunziato, 2020). Health consumers possess varying levels of skills in authenticating information. Assessing online information effectively requires advanced digital literacy and analytical skills, which are not uniformly distributed across the population. (Chen et al., 2020). Access to a wide range of health information also increases understanding of the right use of AI generative applications in the medical field (Koski et al., 2022). Thus, the researchers proposed the following hypothesis:

H_3. Information overload is positively correlated with AI literacy level poses by health consumers.

AI hallucination and AI literacy. When it comes to trusting AI-generated tools developed specifically for healthcare, health consumers often hesitate to believe that these tools sometimes provide misinformation regarding health (Demartini et al., 2020). AI hallucinations cause misperceptions and anxiety and might be injurious to health (Hatem et al., 2023). AI generative tools were supposed to be a reliable source for seeking and sharing health information.

As a result, health consumers' consult unauthentic apps instead of healthcare professionals, which can badly damage their health (Shah et al., 2024). Hallucination identifies the boundaries of AI and also requires critical insight. Understanding the hallucination issues faced by consumers can drive the efforts made by research and development to advance AI generative tools to make them trustworthy and authentic. It can contribute in developing AI tools that can be beneficial for both healthcare and the community as a whole (Moulaei et al., 2024). Hallucination is an issue that could be taught to educate health consumers to understand AI, its barriers, and its benefits (Athaluri et al., 2023). Thus, the researchers hypothesized:

H_4. AI hallucination is positively correlated with AI literacy level poses by health consumers.

Health information anxiety and AI literacy. Health information anxiety is defined as the negative feelings and pressure experienced by consumers when they search for health information, especially on the Internet (Schiavo et al., 2024). Conversely, AI-literate users have the capabilities to understand, use, and analyze AI-generative tools and effectively evaluate health information from the flood of information (Zhao et al., 2024). Health consumers with low digital literacy skills or unfamiliar with advanced technologies like AI often experience health information anxiety. This is why they struggle to know critical health issues, via the Internet or without the Internet, which can create hurdles in the advancement of AI proficiency (Duplaga et al., 2024). Those users who do not trust AI-generated text avoid using these healthcare apps, whether these are favorable (Kim et al., 2023). Consequently, this mistrust can lead to health information anxiety, as well as a flood of information on the Internet creating information anxiety among health consumers with low level of AI literacy (Lund et al., 2024). Thus, the researchers hypothesized:

H_5. Information anxiety is positively correlated with AI literacy level poses by health consumers.

Health information avoidance and AI literacy. Health information avoidance can be defined as the active or passive behavior of trying to prevent or delay exposure to health-related information, even when that information might be relevant to one's health (Jia and Li, 2024; Wang et al., 2024b). Information avoidance is the opposite of information seeking. This can be due to fear, a feeling of being overwhelmed, or a lack of trust in information sources. (Jia and Li, 2024). Information avoidance can be a coping mechanism in response to information anxiety. It can also take place due to the low level of consumers trust in AI tools. Low AI literacy might also contribute to avoidance of AI-generated health information (Abdulateef et al., 2021). The direct influence of health information avoidance is yet unclear; the indirect associations suggest that health information avoidance is experienced by low attention to AI proficiency among certain populations (Jia and Li, 2024; Ko et al., 2023). Health information avoidance can be decreased by motivating health consumers to develop advanced technological skills to access up-to-date information and become AI literate so that they can use AI tools with confidence (Cheng and Peng, 2024). Thus, the researchers proposed the following hypothesis:

H_6. Information avoidance is positively correlated with AI literacy level among health consumers.

AI literacy and health information behavioral intention. AI literacy skills enable health consumers to determine the reliability and validity of health information. AI literacy empowers health consumers to differentiate real information from misinformation. It also decreases the chances of getting caught in the clutches of AI tools (Wang et al., 2024a). Health consumers can also make decisions according to their current health conditions when they understand the limitations and potential biases of AI-generated apps (Crook et al., 2016). AI literacy also enhances the trust of health consumers to use AI-generated apps such as symptom checkers, virtual health assistants, and personal healthcare apps (Shahsavar and Choudhury, 2023b). AI-literate health consumers find AI tools very helpful. This leads to high adoption and utilization of AI tools, and it can improve health outcomes (Chew and Achananuparp, 2022). Therefore, the following hypothesis was formulated:

H_7. AI literacy significantly influence health information behavioral intention among health consumers for health information seeking.

AI literacy and AI chatbot use. With the help of AI chatbots, individuals encounter personalized learning

according to their needs. They also propose instant suggestions and recommendations for better improvement so other health consumers can understand easily (Kajiwara and Kawabata, 2024). AI-literate feel AI chatbots are helpful, as they complete their critical tasks within no time (Ng et al., 2021). Moreover, AI chatbots provide fast and reliable health information, which saves time and energy. AI-literate consumers also use AI-generated apps to reorganize their workload and complete work with greater proficiency (Nadarzynski et al., 2019). AI chatbots can analyze a lot of data and can guide consumers to make valuable decisions accordingly (Alaaeldin et al., 2021). Another benefit of AI chatbots is that they provide information in numerous languages to control language hurdles (Mohan et al., 2023). AI chatbots also facilitate disabled persons by the provision of healthcare (Huq et al., 2024). The following hypothesis was formulated:

H_8. Health information behavioral intention significantly influence on generative AI Chatbots adoption and use among health consumers.

Research methodology

A cross-sectional survey was conducted among health consumers (general public) in the Muzaffarabad division of Azad Jammu & Kashmir (AJ&K), Pakistan. AJ&K comprises three administrative divisions (Muzaffarabad, Mirpur, Poonch), with Muzaffarabad division further divided into three districts: Muzaffarabad, Neelum Valley, and Jhelum Valley. The target population included adults (aged ≥ 18 years) who were either using AI chatbots (e.g., ChatGPT, Gemini), or at least recognized, in the region for health information seeking.

Research setting

The study was conducted in the Muzaffarabad division of Azad Jammu & Kashmir (AJ&K), Pakistan, a region with unique socio-demographic, technological, and healthcare characteristics that make it an insightful setting for investigating factors influencing AI literacy for health information seeking. The study's focus on the Muzaffarabad division (comprising urban, peri-urban, and remote districts like Neelum Valley) ensures diverse insights across different factors and AI literacy levels. Despite being a semi-autonomous region with geographical challenges, AJ&K has seen rapid growth in Internet and smartphone usage in recent years (with 4G coverage expanding to 70% of the region as of 2023) (Authority, 2024), creating a fertile ground for digital health tools. The younger population (particularly in urban centers like Muzaffarabad city) is increasingly tech-savvy, with exposure to AI-driven tools such as ChatGPT, Gemini, and other generative AI chatbots through social media and educational platforms. Preliminary surveys and local digital literacy reports indicate that AI-based health information seeking is emerging, especially among consumers seeking alternatives to limited healthcare resources (Hamid and Tahir, 2023). Moreover, AJ&K faces healthcare accessibility challenges due to its mountainous terrain and limited specialist facilities, prompting residents to rely on digital health tools for preliminary medical advice (Shen et al., 2024). The adoption of AI chatbots for health queries aligns with global trends but remains understudied in rural and semi-urban Pakistani contexts, making this region a valuable case study. Findings from AJ&K can inform AI literacy initiatives in similar low-resource settings where digital health tools are increasingly used but formal health infrastructure is underdeveloped. Moreover, there exist limited studies that have assessed factors influencing AI literacy for health in AJ&K, despite its unique position as a conflict-affected region with escalating digital reliance. By selecting AJ&K, this study captures an underrepresented yet digitally evolving population, contributing to the global discourse on AI literacy while addressing region-specific healthcare information-seeking behaviors.

Data collection tool

The data collection tool was developed after reviewing the relevant available literature (Familoni and Onyebuchi, 2024; Hatem et al., 2023; Ivanov et al., 2024; Ng et al., 2021; Shamlou et al., 2022) and also assessing information-seeking behavior of health consumers using AI chatbots. The questionnaire was based on two sections. The first section consists of demographic information of participants which includes; gender, age, education level, living status, and living setting. Section two contains sub-scale involving nine constructs based on the Theory of Planned behavior (TPB). These constructs are: information seeking (INS), information sources exposure (ISE), information overload (IFO), AI hallucination (AIH), information anxiety (ANX), information

Table 2. Cronbach's alpha coefficients value.

Sr. No	Constructs	No. of items	Cronbach's Alpha
1	Information Seeking (INS)	8	0.804
2	Information Source Exposure (ISE)	7	0.903
3	Information Overload (IFO)	7	0.814
4	AI hallucination (AIH)	7	0.881
5	Information Anxiety (ANX)	6	0.802
6	Information Avoidance (AVD)	6	0.881
7	Artificial Intelligence literacy (AIL)	7	0.910
8	Health Information Behavioral Intention (BI)	8	0.837
9	AI Chatbots Use (AIC)	7	0.867

avoidance (AVD), AI literacy (AIL), behavioral intention (BI) and AI chatbots use (AIC). The constructs ANX and AVD consist of six items, ISE, IFO, AIH, AIL and AIC contains seven statements, and the constructs INS and BI entail eight items. Overall, questionnaire holds nine constructs and 63 statements.

Validity and reliability measurements. The validity of a questionnaire was evaluated by two experts from the fields of AI and information science. The suggested changes that were incorporated as a result of experts' review were related to increasing the clarity of the items. This update carries a reorganization of a few statements and phrases to enhance readability and improve sequence. The first 30 responses were used to conduct pilot testing of the questionnaire. To determine the questionnaire's reliability, the SPSS Cronbach's Alpha test was used. This test generated a value of 0.930 for the 63 statements under nine constructs, indicating good reliability for the questionnaire. The score of Cronbach's alpha coefficients for each construct measured in this study is given in Table 2.

The measurement model demonstrates (Table 3) that all constructs show excellent Composite Reliability (CR) (0.874–0.892), well above the 0.7 threshold. The average variance extracted (AVE) values (0.483–0.551) meet the 0.5 benchmark, indicating adequate convergent validity. Maximum Shared Variance (MSV) values (0.164–0.40) are below corresponding AVEs, supporting discriminant validity. Maximum Reliability (MaxR(H)) values (0.904–0.917) confirm strong construct reliability. The correlation analysis indicates that most correlations are significant at $p < .001$ (***) or $p < .01$ (**). The strongest relationship exists between AIH (AI Hallucination) and ANX (Anxiety) (0.635***). INS (Information Seeking) also show strong correlation with ISE (Information Source Exposure) (0.567***).

Univariate and multivariate normality assessment. The normality estimation is a key part of SEM analysis; otherwise, it can compromise 'parameter estimates,' 'standard errors,' and 'hypotheses testing.' To measure normality, we calculated skewness and kurtosis by using the 'maximum likelihood estimation' (MLE) method. All variables meet the desired conditions for skewness (< 3) (Kline, 2023), kurtosis (< 7), and multivariate kurtosis (< 5) (Yuan et al., 2005), requiring reasonably symmetry and observance to univariate and multivariate normality criteria (West et al., 1995). Outliers were identified and discarded using Mahalanobis d-squared method.

Data collection process

Data were collected from September to November 2024 through both printed (face-to-face) surveys and online (Google Form) surveys. Printed questionnaires were distributed across public spaces (hospitals, community centers) in Muzaffarabad, Neelum Valley, and Jhelum Valley. An online survey (Google Form) was shared via online local health forums, community networks, and social media groups within the Muzaffarabad division. The mixed-mode survey approach is well-supported in global health research and tailored to the region's constraints (Coffey et al., 2024). Online survey reduced exclusion bias in low-resource settings, as well as reduced expenses for remote areas where travel was challenging (e.g., mountainous Neelum Valley). Moreover, parallel data collection accelerated recruitment (completed in 3 months).

Sample size calculation and sampling strategy. A purposive sampling technique was employed to recruit participants who met the inclusion criteria: (i) residents of AJ&K's Muzaffarabad division, (ii) active users of digital health tools or AI chatbots, and (iii) willingness to provide informed consent. The purposive sampling technique was chosen for this study due

Table 3. Model validity measures.

Constructs	CR	AVE	MSV	MaxR(H)	INS	ISE	AVD	AIH	IFO	ANX
INS	0.883	0.483	0.321	0.905						
ISE	0.874	0.501	0.321	0.904	0.567***					
AVD	0.887	0.551	0.165	0.915	0.162***	0.119**				
AIH	0.881	0.521	0.403	0.912	0.144***	0.230***	0.336***			
IFO	0.892	0.532	0.164	0.917	0.122**	0.226***	0.241***	0.405***		
ANX	0.882	0.538	0.403	0.911	0.119**	0.193***	0.406***	0.635***	0.379***	

$p < .001$ (***), $p < .01$ (**), $p < .05$ (*).

to its methodological and contextual reasons. For example, the study focuses on AI chatbot users for health information seeking, a relatively niche group in AJ&K, where AI adoption is emerging but not yet widespread. Thus, purposive sampling ensures recruitment of participants who actively meet the inclusion criteria (e.g., prior use of ChatGPT/Gemini for health queries), avoiding the inefficiency of random sampling, which might yield too few qualified respondents. But purposive sampling allows deliberate selection of information-rich cases, ensuring participants can meaningfully contribute. Moreover, purposive sampling enables targeted outreach via digital channels (social media, local community networks) to reach tech-savvy users, as well as identifying individuals using AI chatbots for information seeking in local health and community centers. Using G*Power 3.1 with an effect size of 0.3 (moderate), power of 0.95 (conventionally, > 0.80) (Cohen, 1988), and alpha = 0.05, the minimum required sample size was 400 for structural equation modeling (Soper, 2020). To enhance statistical robustness and generalizability while minimizing sampling error, we distributed 1000 questionnaires (both printed and online via Google Forms), obtaining 715 valid responses (71.5% response rate) after excluding incomplete responses (n = 30).

Data analysis procedure

Data analysis was carried out by using 'Statistical Package for Social Sciences' (SPSS) software version 26. Using Chi-Square tests, we examined the differences in respondents' gender distribution across categorical variables including age, education level, field of study, living status, and living settings. A nine-factor measurement model (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, AIC) was developed based on the Theory of Planned Behavior (TPB) (Figure 1) and tested using the structural equation modeling (SEM). Subsequently, SEM was employed to validate the proposed hypotheses. The significance threshold was set at $p < .05$ for all analyses.

Ethical approval

The study was accompanied by the endorsement of the 'Departmental Research Committee' (DRC) of the Department of Information Management at the 'Islamia University of Bahawalpur', Pakistan. It adhered to research ethics by ensuring consensus from all study subjects. The study's subjects were volunteers who could opt out at any time.

Findings

Demographic information

Of the 715 participants, the majority 449 (62.8%) were females and 266 (37.2%) were males. Using Chi-square, we found a statistically non-significant difference in the distribution of females and males across different age groups ($\chi^2 = 1.523$, $p = .467$, phi's value = .046). However, a statistically significant difference was found in the education level of male and female participants ($\chi^2 = 6.403$, $p = .041$, phi's value = .095). There were 41.6% postgraduate females as compared to 32.3% males. Moreover, a non-significant difference was assessed between respondents' fields of study ($\chi^2 = 4.279$, $p = .0233$, phi's value = .077). Furthermore, there were no significant differences found in the distribution of living status of gender ($\chi^2 = 0.030$, $p = .862$, phi's value = .006), and living setting-wise distribution in rural and urban areas ($\chi^2 = 0.595$, $p = .743$, phi's value = .029) (Table 4).

Structural equation modeling (SEM)

SEM was applied to test the proposed conceptual framework in Figure 1, confirming the validity of

Table 4. Demographic information of the respondents.

Health Consumers	Male	Female	χ2 Value	p-Value	Phi/ Cramer's V
Age					
Less than 20 years	18 (6.8%)	26 (5.8%)	1.523	0.467	.046
21–25 years	166 (62.4%)	265 (59%)			
More than 25 years	82 (30.8%)	158 (35.2%)			
Total	266 (37.2%)	449 (62.8%)			
Education Level					
Undergraduate	22 (8.3%)	28 (6.2%)	6.403	0.041	.095
Graduate	158 (59.4%)	234 (52.1%)			
Postgraduate	86 (32.3%)	187 (41.6%)			
Total	266 (37.2%)	449 (62.8%)			
Discipline					
Sciences	76 (28.6%)	101 (22.5%)	4.279	0.233	.077
Social Sciences	106 (39.8%)	207 (46.1%)			
Arts and Humanities	72 (27.1%)	117 (26.1%)			
Other	12 (4.5)	24 (5.3)			
Total	266 (37.2%)	449 (62.8%)			
Living Status					
Living Alone	56 (21.1%)	97 (21.6%)	0.030	0.862	.006
Living with the Family	210 (37.4%)	352 (62.6%)			
Total	266 (37.2%)	449 (62.7%)			
Living Setting					
Rural	113 (37.2%)	197 (62.8%)	0.595	0.743	.029
Urban	150 (36.5%)	255 (63.5%)			
Total	266 (37.2%)	449 (62.8%)			

hypotheses and identifying the factors influencing AI literacy and its impact on health behavioral intention.

Standardized estimation of regression weights. The standardized estimation of regression weights for the loadings of the latent constructs is shown in (Figure 2). The loading values of the constructs (INS, ISE, IFO, AIH, ANX, AVD, AIL, BI, and AIC) were diverse, ranging between $\beta = 0.57$ and $\beta = 0.83$, showing the acceptable validity of the estimated constructs. The latent variables ANX and AVD consist of six observable variables each, and their loading values range between $\beta = 0.75$ and $\beta = 0.83$, which indicates good loadings on the constructs. Similarly, the latent variables ISE, IFO, AIH, AIL, and AIC contain seven statements each, and their loading values range between $\beta = 0.75$ and $\beta = 0.81$, exhibiting good loadings on the constructs. Whereas the loading values of INS and BI consist of eight items each, ranging between $\beta = 0.63$ and $\beta = 0.80$, demonstrating good loadings on the constructs.

The estimation of path coefficient values determined that INS ($\beta = 0.05$), IFO ($\beta = 0.12$), ANX ($\beta = 0.18$), AVD ($\beta = 0.17$) positively correlated with AIL (as shown in H_1, H_3, H_5, H_6). On the other hand, ISE ($\beta = -.03$), AIH ($\beta = -.08$) negatively correlate with AIL (as shown in H_2, H_4). However, AIL ($\beta = 0.07$) had a positive influence on BI (as shown in H_7). Similarly, BI ($\beta = 0.10$) also had a positive influence on AIC (as shown in H_8) (Figure 2).

Standardized estimation of correlation among latent variables. The measurement of standardized correlations among latent variables is shown in Figure 2. The latent variables INS, ISE, IFO, AIH, ANX, and AVD had weak to strong correlations ($\beta = 0.23$ to $\beta = 0.63$) with each other. Similarly, INS and IFO ($\beta = 0.12$), ISE and AIH ($\beta = 0.23$), IFO and ANX ($\beta = 0.38$), AIH and AVD ($\beta = 0.34$) had weak to moderate correlations. Moreover, INS and AIH ($\beta = 0.14$), ISE and ANX ($\beta = 0.19$), IFO and AVD ($\beta = 0.24$) had a weak correlation. Likewise, INS and ANX ($\beta = 0.12$), ISE and AVD ($\beta = 0.12$) also had weak correlations with each other. Furthermore, INS and AVD ($\beta = 0.16$) were weakly associated with each other.

Standardized estimation of regression weights and validation of hypotheses. Table 5 shows the

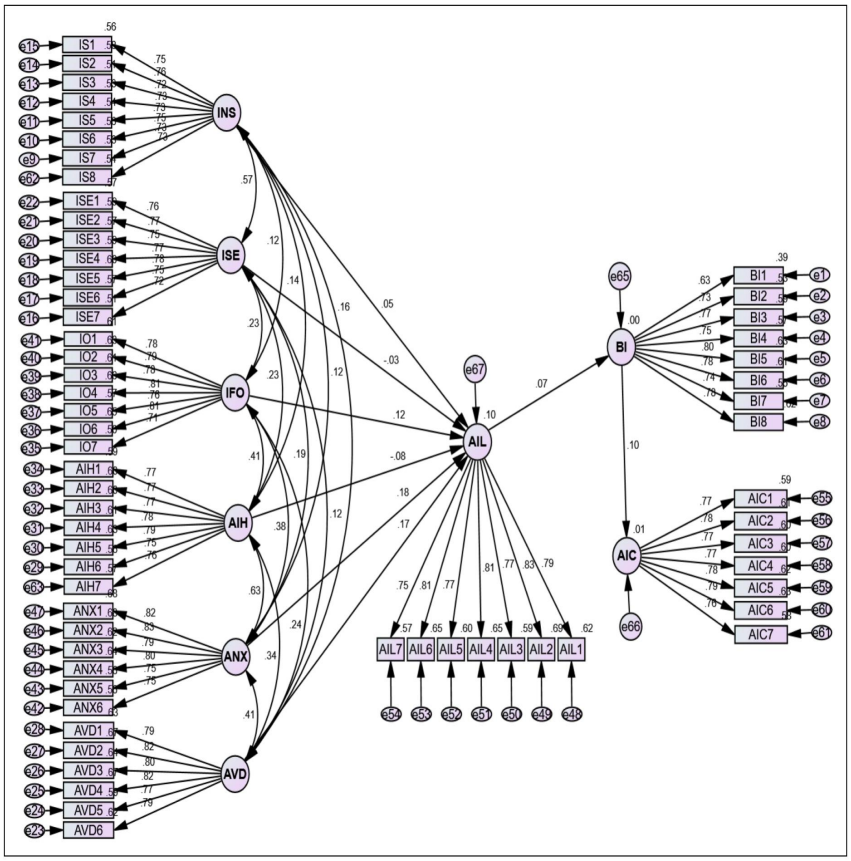


Figure 2. Measuring the constructs of structural equation modeling (SEM). Constructs: Information Seeking (INS), Information Sources exposure (ISE), Information Overload (IFO), AI Hallucination (AIH), Information Anxiety (ANX), Information Avoidance (AVD), AI Literacy (AIL), Health behavioral Intention (BI), and AI Chatbots Use (AIC).

standardized estimation of regression, the standard error (SE) for the estimation of constructs, the critical ratio (CR), the level of significance, and the validation of proposed hypotheses. Regression analysis is a measurement that empowers the researcher to gauge the differences between constructs. The notation (***) indicates a statistically significant result at the 0.001 level.

The results of SEM analysis demonstrate that IFO ($\beta = 0.138$, $CR = 2.731$, $p < .05$), ANX ($\beta = 0.175$, $CR = 3.103$, $p < .05$), and AVD ($\beta = 0.158$, $CR = 3.855$, $p < .05$) had a statistically positive significant influence on AIL. Similarly, BI ($\beta = 0.128$, $CR = 2.423$, $p < .05$) had a statistically positive significant influence on AIC. A positive but non-significant effect of INS on AIL was also observed ($\beta = 0.058$, $CR = 1.006$, $p > .05$). AIL also had a positive but non-significant effect on BI ($\beta = 0.050$, $CR = 1.598$, $p > .05$). Conversely, ISE ($\beta = -0.040$, $CR = -0.657$, $p > .05$), and AIH ($\beta = -0.079$, $CR = -1.376$, $p > .05$) had a negative non-significant influence on AIL.

Squared multiple correlations. The results of squared multiple correlations demonstrated that AI literacy caused 10% of variance in the relationship between INS, ISE, IFO, AIH, ANX, AVD, and BI (Figure 2).

Model fit indices. The goodness values of model fit, as shown in Table 6, indicate that the proposed model is acceptable.

Discussion

This study aims to measure and validate the Theory of Planned Behavior (TPB) and identify the factors

Table 5. Validation of the hypotheses.

	Factor	Estimate	S.E	C.R	p-Value	Result
H_1	INS—> AIL	.058	.057	1.006	.314	Rejected
H_2	ISE—> AIL	−.040	.061	−.657	.511	Rejected
H_3	IFO—> AIL	.138	.050	2.731	.006	Accepted
H_4	AIH—>AIL	−.079	.057	−1.376	.169	Rejected
H_5	ANX—>AIL	.175	.056	3.103	.002	Accepted
H_6	AVD—>AIL	.158	.041	3.855	***	Accepted
H_7	AIL—>BI	.050	.031	1.598	.110	Rejected
H_8	BI—> AIC	.128	.053	2.423	.015	Accepted

Table 6. The goodness of model fit indices values.

Model fit indices	$\chi 2$	DF	IFI	TLI	CFI	RMSEA
Acceptable fit	$\chi 2 \leq 3$	DF	IFI $\geq .90$	TLI $\geq .90$	CFI $\geq .90$	RMSEA $\leq .08$
Model fit values	1.679	1867	0.954	0.951	0.953	0.031

influencing AI literacy and its subsequent influence on consumers' health behavior towards seeking health information from using generative AI chatbots. Eight hypotheses were developed to assess the relationship between the TPB constructs and AI literacy. The result of the structural equation modeling (SEM) analysis proved that out of eight hypotheses, four were accepted (as shown in Table 7).

The findings of our study support the findings of previous studies (Shahrzadi et al., 2024; Stenzl et al., 2024) that information overload has a statistically significant positive influence on AI literacy. These findings showed that good knowledge of AI skills could help evaluate health information across various AI models or chatbots to make informed health decisions (Nadarzynski et al., 2019; Shen et al., 2024; Wang et al., 2024b). Similarly, the findings of our study are consistent with the findings of prior research (Cheng and Peng, 2024; Crook et al., 2016; Duplaga et al., 2024), showing that information anxiety and information avoidance have a statistically significant positive influence on AI literacy. This indicates that sound knowledge of AI literacy skills can change consumers' perception about innovative technology, increase information-seeking behavior, and decrease avoidance behavior. Moreover, our study findings are aligned with the findings of studies (Chen and Decary, 2020; Chew and Achananuparp, 2022; Shahsavar and Choudhury, 2023a), that health information behavioral intention has a statistically positive significant influence on AI chatbots. This finding suggests that individuals with higher levels of AI literacy skills are more likely to rely on AI chatbots to seek healthcare for self-diagnosis than those with low AI skills (Kimiafar et al., 2023).

Alternatively, the findings of our study are comparable with the results of past research (Platt et al., 2024; Soroya et al., 2024) that information seeking has a statistically positive but non-significant influence on AI literacy. These findings demonstrate that to share more information and raise awareness among consumers about AI systems, we can advance AI literacy. Similarly, our findings are consistent with previous research findings (Esmaeilzadeh, 2020; Familoni and Onyebuchi, 2024) that AI literacy has a positive but non-significant influence on health information behavioral intention. This suggests that improved AI literacy skills could have a potential effect on an individual's capability to understand, search for, and use health information competently and effectively.

On the other hand, the findings of our study negate the findings of past studies (Agarwal et al., 2024; Brown and Halpern, 2021; Burns et al., 2024), that health information source exposure and AI hallucination have a statistically negative but non-significant influence on AI literacy. This indicates that overexposure and hallucinated health information generated by AI chatbots or models can be countered by improving consumers' skills in AI literacy. Specifically, health consumers with higher AI literacy are better equipped to recognize the limitations of AI and critically evaluate health information-generative by AI tools, thereby reducing the risks posed by AI hallucinations (Ali and Mughari, 2024).

Table 7. Summary of key findings.

Variable	Influenced by	Effect size (β)	Critical ratio (CR)	p-value
AI Literacy (AIL)	Information Overload (IFO)	0.138	2.731	< .05
AI Literacy (AIL)	Information Anxiety (ANX)	0.175	3.103	< .05
AI Literacy (AIL)	Information Avoidance (AVD)	0.158	3.855	< .05
AI Chatbots Use (AIC)	Behavioral Intention (BI)	0.128	2.423	< .05

IFO → AIL (β = 0.138), ANX → AIL (β = 0.175), AVD → AIL (β = 0.58), BI → AIC (β = 0.128).

Implications of the study

Building on these insights, our study extends the Theory of Planned Behavior (TPB) by incorporating novel variables, i.e., information seeking, information source exposure, information overload, and AI hallucination, to better understand health consumers' health information-related decision-making in the age of generative AI. The study's findings emphasize that AI literacy is a shared responsibility in which healthcare professionals should guide safe AI generative tool adoption, health consumers need skills to navigate AI-generated health information critically, and institutions should provide infrastructure for oversight.

The study highlights the need to develop AI literacy among health consumers. It suggests a need to actively engage with emerging AI technologies and their applications in healthcare. It suggests organizing targeted workshops, seminars, and research initiatives that could educate consumers about the capabilities and limitations of AI generative tools. Moreover, professional education and training are essential for developing the analytical skills needed to assess health information from AI-driven sources (Alkurdi et al., 2024). Therefore, it is suggested that health organizations and departments should offer specialized training programs on AI literacy, involving seminars, workshops, and online courses on using generative AI and its applications for health information seeking and health-related decisions. Healthcare professionals can develop guardrails for high-risk scenarios and can educate patients on safe AI use.

This study highlights the potential of AI in advancing consumers' critical skills and contributes to a deeper understanding of the field. It might be helpful to make informed health decisions, especially in the evolving area of clinical research and digital healthcare. Health professionals are motivated to take initiative and adopt policies and to keep up-to-date about the current developments in AI through continuous professional education improvement, training on AI technologies, and encouragement to promote interdisciplinary research collaboration that enhances AI literacy, which ultimately changes consumers' intention toward seeking healthcare from AI chatbots or software.

Furthermore, this study also identifies the need for understanding cultural and contextual background and highlights the problems confronted by health consumers and requirements for specific AI frameworks grounded in the local perspective. To implement and integrate AI in healthcare, infrastructure limitations, regulatory features, and effective strategies must be acknowledged. However, periodically evaluating scalability, repair needs, and usability will ensure benefits and mitigate potential problems that may arise after the adoption of AI generative tools. Health consumers and professionals are encouraged to adopt AI in healthcare settings, more analysis of AI expertise, cultural variations, consumers' understandings, experiences, and long-lasting sustainability is vital.

Limitations of the study

The present study is structured on respondents' self-reported data, which was collected through a cross-sectional research design accompanied by various biases, such as response bias, methodological bias, low level of knowledge, understanding of the questionnaire's statements, etc. Despite the inherent limitations of survey research, we have implemented several strategies to mitigate these issues. Two experts, for example, pre-tested and assessed the questionnaire, and 30 responses were used for pilot testing. The questionnaire's reliability was ensured using Cronbach's Alpha. All participants were provided with pre-survey explanations of questionnaire items and ongoing support for any clarification needs during the study. Moreover, the composite reliability, convergent validity, discriminant validity, and construct reliability of the model were also measured and ensured. The data collected was also checked for normality and outliers before analysis. While self-report data has limitations

for measuring complex constructs like AI literacy, it remains the most feasible method for capturing users' subjective experiences and intentions at scale. Moreover, our study examined psychological constructs (perceptions, intentions, anxiety) that are inherently subjective and best captured through self-report. Future research could acknowledge these limitations by adopting an experimental research design. We included health consumers (the general public) as a sample of our study from the state of Azad Jammu and Kashmir (AJ&K) only from divisions of Muzaffarabad districts (Muzaffarabad, Neelum Valley, and Jhelum valley). Further research studies may expand their sample size by the inclusion of two other divisions, i.e., the Mirpur division (Mirpur, Kotli, and Bimber) and the Poonch division (Rawalakot, Bagh, and Sudhnoti). We selected six predictors that influence AI literacy in our study's proposed framework based on the Theory of Planned Behavior (TPB) (Figure 1). However, exploring some additional relevant predictors of AI literacy, i.e., privacy and security of research data, user trust, and authenticity of information sources, could offer valuable insights. We did not acknowledge the respondents' geographical settings and healthcare infrastructure. This would also affect the generalizability of our study findings. Finally, we did not examine the moderating influence of respondents' age, gender, and qualification level to see the difference, if any, in their AI literacy skills.

Conclusion

Our study confirms the validity of the Theory of Planned Behavior (TPB) framework in examining the factors influencing AI literacy among health consumers and its influence on behavioral intention to seek health information using generative AI chatbots. The study results identified that information overload, anxiety, and avoidance are the significant factors influencing AI literacy levels. While information source exposure, AI hallucinations, and information seeking are the non-significant factors influencing AI literacy levels among health consumers. Furthermore, this study suggests that a comprehensive framework on AI literacy could be introduced that could help in equipping health professionals with the knowledge and competency to raise awareness regarding AI tools as well as to promote AI literacy among healthcare consumers. Libraries can be very instrumental in organizing training sessions on AI literacy and developing AI literacy instruction programs. Our study suggests that further research is needed to explore the impact of AI literacy on the changing healthcare landscape. It suggests developing mechanisms for assimilating AI literacy with health literacy to assess consumers' health behavior. It also suggests addressing the evolving challenges of AI-mediated health information seeking. Moreover, future studies should also focus on developing strategies and interventions to improve AI literacy skills among different population groups such as patients with chronic diseases, students, and the general public. Additionally, empirical comparative studies are needed to evaluate AI literacy across different healthcare settings and demographic contexts.

Acknowledgement

This paper was supported by Guangdong Provincial library Research Project: Construction of a Performance Evaluation System for University Library Information Services (GDTK23030) and the Chinese Association of Agricultural Science Societies. Construction of a Dual-Chain Integrated Model for Cultivating Innovative Talents in Agricultural Intellectual Property (PCE2234).

Declaration of conflicting interests

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

Data availability statement

Informed consent was obtained from all questionnaire respondents.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed consent statement

Informed consent was obtained from all questionnaire respondents.

Institutional review board statement

The study was approved by the Departmental Research Committee (DRC), Department of Information Management, The Islamia University of Bahawalpur, Pakistan under approval code 8-2024/DoIM.

No personally identifiable information was collected from questionnaire respondents. Participation consents were obtained in verbal or written from each individual participant in the study.

ORCID iD

Salman Bin Naeem https://orcid.org/0000-0003-4335-8080

References

Abdulateef AA, Mohammed AH and Abdulateef IA (2021) The avoidance and detection function of artificial intelligence in COVID-19. In: *2021 3rd International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)*, pp.1–7: IEEE.

Abetti PA (2004) Government-supported incubators in the Helsinki region, Finland: Infrastructure, results, and best practices. *The Journal of Technology Transfer* 29(1): 19–40.

Abraham C and Sheeran P (2005) The health belief model. *Predicting Health Behaviour* 2(1): 28–80.

Adegboye M (2024) Impact of artificial intelligence on health information literacy: guidance for healthcare professionals. *Library Hi Tech News* 41(7): –4.

Agarwal V, Jin Y, Chandra M, et al. (2024) MedHalu: Hallucinations in responses to healthcare queries by large language models. *arXiv preprint arXiv:2409.19492*.

Ai W (2023) *Integrating Design Literacy Within Chinese Health Promoting Hospitals*. London, UK: Royal College of Art.

Ajzen I (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50(2): 179–211.

Alaaeldin R, Asfoura E, Kassem G, et al. (2021) Developing chatbot system to support decision making based on big data analytics. *Journal of Management Information and Decision Sciences* 24(2): 1–15.

Ali MA and Mughari S (2024) Effect of AI literacy on online information search competencies among medical students in Pakistan. *Information Development*: 02666669241299765. https://doi.org/10.1177/02666669241299765.

Alkurdi D, Rasouli S and Jia B (2024) The role of artificial intelligence in modern medical education and practice: A systematic literature review. *MedRxiv*. https://doi.org/10.1101/2024.07.25.24311022.

Athaluri SA, Manthena SV, Kesapragada VKM, et al. (2023) Exploring the boundaries of reality: investigating the phenomenon of artificial intelligence hallucination in scientific writing through ChatGPT references. *Cureus* 15(4): e37432. https://doi.org/10.7759/cureus.37432.

Austvoll-Dahlgren A, Falk RS and Helseth S (2012) Cognitive factors predicting intentions to search for health information: An application of the theory of planned behaviour. *Health Information & Libraries Journal* 29(4): 296–308.

Authority PT (2024) Pakistan Telecommunication Authority Annual Report 2023. Reportno. Report Numberl, Date. Place Publishedl: Institutionl.

Berkman ND, Sheridan SL, Donahue KE, et al. (2011) Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine* 155(2): 97–107.

Bhatt P, Liu J, Gong Y, et al. (2022) Emerging artificial intelligence–empowered mhealth: Scoping review. *JMIR mHealth and UHealth* 10(6): e35053.

Bouanna J, Diaz-Valdes G, Frizzell L, et al. (2020) *The World Wide Race for Artificial Intelligence: A Path Forward for US Policy*. Washington: University of Washington.

Bravo MCM, Chalezquer CS and Serrano-Puche J (2021) Meta-framework of digital literacy: A comparative analysis of 21st-century skills frameworks. *Revista Latina de Comunicacion Social* (79): 76–109. https://doi:10.4185/RLCS-2021-1508.

Brown JE and Halpern J (2021) AI Chatbots cannot replace human interactions in the pursuit of more inclusive mental healthcare. *SSM-Mental Health* 1: 100017.

Burns B, Nemelka B and Arora A (2024) Practical implementation of generative artificial intelligence systems in healthcare: A United States perspective. *Future Healthcare Journal* 11(3): 100166.

Chander B, Pal S, De D, et al. (2022) *Artificial Intelligence-Based Internet of Things for Industry 5.0*. Cham.: Springer.

Chen IY, Joshi S and Ghassemi M (2020) Treating health disparities with artificial intelligence. *Nature Medicine* 26(1): 16–17.

Chen M and Decary M (2020) Artificial intelligence in healthcare: An essential guide for health leaders. *Healthcare Management Forum* 33(1): 10–18.

Cheng X and Peng G (2024) Study on the behavioral motives of algorithmic avoidance in intelligent recommendation systems. *Journal of Global Information Management (JGIM)* 32(1): 1–22.

Chew HSJ and Achananuparp P (2022) Perceptions and needs of artificial intelligence in health care to increase adoption: Scoping review. *Journal of Medical Internet Research* 24(1): e32939.

Coffey S, Maslovskaya O and McPhee C (2024) *Recent Innovations and Advances in Mixed-Mode Surveys*.

Cohen J (1988) *Statistical Power Analysis for the Behavioral Sciences*. New York: Routledge.

Cooke NA (2017) Posttruth, truthiness, and alternative facts: Information behavior and critical information consumption for a new age. *The Library Quarterly* 87(3): 211–221.

Coskun AB, Elmaoglu E, Buran C, et al. (2024) Integration of chatgpt and E-health literacy: Opportunities, challenges, and a look towards the future. *Journal of Health Reports and Technology* 10(1): e139748.

Crook B, Stephens KK, Pastorek AE, et al. (2016) Sharing health information and influencing behavioral intentions: The role of health literacy, information overload, and the internet in the diffusion of healthy heart information. *Health Communication* 31(1): 60–71.

Demartini G, Mizzaro S and Spina D (2020) Human-in-the-loop artificial intelligence for fighting online misinformation: Challenges and opportunities. *IEEE Data Eng. Bull* 43(3): 65–74.

Duplaga M, Smola P and Wojcieszko M (2024) The interplay of technology anxiety and digital health literacy in determining e-health readiness. *European Journal of Public Health* 34(Supplement_3): ckae144. 1180.

Dzangare G and Gulu TA (2025) Adopting artificial intelligence for health information literacy: A literature review. *Information Development*: 02666669251314839. https://doi.org/10.1177/02666669251314839.

Elias RA (2021) US National artificial intelligence strategy against the made in China 2025 policy. *Contemporary Chinese Political Economy and Strategic Relations* 7(1): 447–482.

Esmaeilzadeh P (2020) Use of AI-based tools for healthcare purposes: A survey study from consumers' perspectives. *BMC Medical Informatics and Decision Making* 20: 1–19.

Familoni BT and Onyebuchi NC (2024) Advancements and challenges in AI integration for technical literacy: A systematic review. *Engineering Science & Technology Journal* 5(4): 1415–1430.

Feng X, Wang L, Yan Y, et al. (2021) The sustainability of knowledge-sharing behavior based on the theory of planned behavior in Q&A social network community. *Complexity* 2021(1). https://doi.org/10.1155/2021/1526199.

Griffin RJ, Dunwoody S and Neuwirth K (1999) Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental Research* 80(2): S230–S245.

Guo J and Li B (2018) The application of medical artificial intelligence technology in rural areas of developing countries. *Health Equity* 2(1): 174–181.

Hälterlein J (2024) Imagining and governing artificial intelligence: The ordoliberal way—an analysis of the national strategy 'AI made in Germany'. *AI & SOCIETY* 40: 1749–1760.

Hamid M and Tahir R (2023) Use of the internet as source of information for students: A case study of university of kotli AJ&K: Use of the internet as source of information for students. *International Journal of Emerging Trends in Education* 1(2): 1–11.

Hatem R, Simmons B and Thornton JE (2023) A call to address AI "hallucinations" and how healthcare professionals can mitigate their risks. *Cureus* 15(9): e44720. https://doi.org/10.7759/cureus.44720.

Huq SM, Maskeliūnas R and Damaševičius R (2024) Dialogue agents for artificial intelligence-based conversational systems for cognitively disabled: A systematic review. *Disability and Rehabilitation: Assistive Technology* 19(3): 1059–1078.

Ivanov S, Soliman M, Tuomi A, et al. (2024) Drivers of generative AI adoption in higher education through the lens of the theory of planned behaviour. *Technology in Society* 77: 102521.

Jia C and Li P (2024) Generation z's health information avoidance behavior: Insights from focus group discussions. *Journal of Medical Internet Research* 26: e54107.

Johnson JD and Meischke H (1993) A comprehensive model of cancer-related information seeking applied to magazines. *Human Communication Research* 19(3): 343–367.

Kajiwara Y and Kawabata K (2024) AI Literacy for ethical use of chatbot: Will students accept AI ethics? *Computers and Education: Artificial Intelligence* 6(1): 100251.

Kang EY-N, Chen D-R and Chen Y-Y (2023) Associations between literacy and attitudes toward artificial intelligence–assisted medical consultations: The mediating role of perceived distrust and efficiency of artificial intelligence. *Computers in Human Behavior* 139: 107529.

Kim J, Kadkol S, Solomon I, et al. (2023) AI anxiety: a comprehensive analysis of psychological factors and interventions. *Available at SSRN 4573394*. 1–17.

Kimiafar K, Sarbaz M, Tabatabaei SM, et al. (2023) Artificial intelligence literacy among healthcare professionals and students: A systematic review. *Frontiers in Health Informatics* 12: 68.

Kline RB (2023) *Principles and Practice of Structural Equation Modeling*. New York, USA: Guilford publications.

Ko MA, Shah UN and Agrawal T (2023) AI In disease avoidance: Recognition, therapy and healthcare. In: *2023 International conference on advances in computation, communication and information technology (ICAICCIT)*, pp.950–955: IEEE.

Koltay T (2017) Data literacy for researchers and data librarians. *Journal of Librarianship and Information Science* 49(1): 3–14.

Koski E, Scheufele EL, Karunakaram H, et al. (2022) Understanding disparities in healthcare: Implications for health systems and AI applications. In: *Healthcare Information Management Systems: Cases, Strategies, and Solutions*. New York: Springer, 375–387.

Lee D and Yoon SN (2021) Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. *International Journal of Environmental Research and Public Health* 18(1): 71.

Lekadir K, Osuala R, Gallin C, et al. (2021) FUTURE-AI: guiding principles and consensus recommendations for trustworthy artificial intelligence in medical imaging. arXiv preprint arXiv:2109.09658.

Li W, Xu S, Zheng X, et al. (2024) Bridging the knowledge gap in artificial intelligence: The roles of social media exposure and information elaboration. *Science Communication* 46(4): 399–430.

Lund BD, Mannuru NR and Agbaji D (2024) AI Anxiety and fear: A look at perspectives of information science

students and professionals towards artificial intelligence. *Journal of Information Science*: 01655515241282001. https://doi.org/10.1177/01655515241282001.

Malik A, Mahmood K and Islam T (2023) Understanding the Facebook users' behavior towards COVID-19 information sharing by integrating the theory of planned behavior and gratifications. *Information Development* 39(4): 750–763.

Markus A, Pfister J, Carolus A, et al. (2024) Effects of AI understanding-training on AI literacy, usage, self-determined interactions, and anthropomorphization with voice assistants. *Computers and Education Open* 6: 100176.

Mehrabian A and Russell JA (1974) *An Approach to Environmental Psychology*. Cambridge, MA, USA: the MIT Press.

Mohan G, Satish G, Patil H, et al. (2023) AI-powered Chatbot for bridging language barriers with translation. In: *2023 3rd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)*, pp.1559–1565: IEEE.

Moulaei K, Yadegari A, Baharestani M, et al. (2024) Generative artificial intelligence in healthcare: A scoping review on benefits, challenges and applications. *International Journal of Medical Informatics* 188: 105474. https://doi.org/10.1016/j.ijmedinf.2024.105474.

Nadarzynski T, Miles O, Cowie A, et al. (2019) Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study. *Digital Health* 5: 2055207619871808.

Ng DTK, Leung JKL, Chu SKW, et al. (2021) Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence* 2: 100041.

Nguyen T-M, Nham PT and Hoang V-N (2019) The theory of planned behavior and knowledge sharing: A systematic review and meta-analytic structural equation modelling. *VINE Journal of Information and Knowledge Management Systems* 49(1): 76–94.

Nunziato DC (2020) Misinformation mayhem: Social media platforms' efforts to combat medical and political misinformation. *First Amendment Law Review*. 19: 32. https://ssrn.com/abstract=3672.

Okonji OR, Yunusov K and Gordon B (2024) Applications of Generative AI in Healthcare: algorithmic, ethical, legal and societal considerations. arXiv preprint arXiv:2406.10632.

Pataranutaporn P, Danry V, Leong J, et al. (2021) AI-generated characters for supporting personalized learning and well-being. *Nature Machine Intelligence* 3(12): 1013–1022.

Platt J, Nong P, Smiddy R, et al. (2024) Public comfort with the use of ChatGPT and expectations for healthcare. *Journal of the American Medical Informatics Association* 31(9): 1976–1982.

Risteska A (2023) Aware and critical navigation in the media landscape:(un) biased algorithms and the need for new media literacy in the era of artificial intelligence and digital media. *КАИРОС: Журнал за медиуми и комуникации* 2(2): 16–38.

Russell RG, Novak LL, Patel M, et al. (2023) Competencies for the use of artificial intelligence–based tools by health care professionals. *Academic Medicine* 98(3): 348–356.

Sai S, Gaur A, Sai R, et al. (2024) Generative ai for transformative healthcare: A comprehensive study of emerging models, applications, case studies and limitations. *IEEE Access* 12(1): 31078–31106.

Schiavo G, Businaro S and Zancanaro M (2024) Comprehension, apprehension, and acceptance: Understanding the influence of literacy and anxiety on acceptance of artificial intelligence. *Technology in Society* 77: 102537.

Shah SB, Thapa S, Acharya A, et al. (2024) Navigating the web of disinformation and misinformation: Large language models as double-edged swords. *IEEE Access*: 1–3. https://doi.org/10.1109/ACCESS.2024.3406644.

Shahrzadi L, Mansouri A, Alavi M, et al. (2024) Causes, consequences, and strategies to deal with information overload: A scoping review. *International Journal of Information Management Data Insights* 4(2): 100261.

Shahsavar Y and Choudhury A (2023a) *The Role of AI Chatbots in Healthcare: A Study on User Intentions to Utilize ChatGPT for Self-Diagnosis*. JMIR Preprints.

Shahsavar Y and Choudhury A (2023b) User intentions to use ChatGPT for self-diagnosis and health-related purposes: Cross-sectional survey study. *JMIR Human Factors* 10(1): e47564.

Shamlou Z, Saberi MK and Amiri MR (2022) Application of theory of planned behavior in identifying factors affecting online health information seeking intention and behavior of women. *Aslib Journal of Information Management* 74(4): 727–744.

Shen Z, Wei S-Y, Adeeb H, et al. (2024) The negative consequences of avoiding health information on health risk behaviors: An SOR perspective. *Information Development*. 02666669241308211. https://doi.org/10.1177/02666669241308211.

Soper DS (2020) A-priori sample size calculator for structural equation models [Software].

Soroya SH, Rehman AU and Faiola A (2024) Exploring the impact of internet and media sources exposure on self-care behavior: Mediating the role of health anxiety, literacy and information-seeking behavior. *Kybernetes* 53(11): 4797–4817.

Southworth J, Migliaccio K, Glover J, et al. (2023) Developing a model for AI across the curriculum: Transforming the higher education landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence* 4: 100127.

Stenzl A, Armstrong AJ, Sboner A, et al. (2024) Artificial INtelligence to support informed DEcision-making (INSIDE) for improved literature analysis in oncology. *European Urology Focus* 10(6): 1011–1018.

Stenzl A, Sternberg CN, Ghith J, et al. (2022) Application of artificial intelligence to overcome clinical information overload in urological cancer. *BJU international* 130(3): 291–300.

Wahl B, Cossy-Gantner A, Germann S, et al. (2018) Artificial intelligence (AI) and global health: How can AI contribute to health in resource-poor settings? *BMJ global Health* 3(4): e000798.

Wang C, Wang H, Li Y, et al. (2024a) Factors influencing university students' behavioral intention to use generative artificial intelligence: Integrating the theory of planned behavior and AI literacy. *International Journal of Human–Computer Interaction*: 1–23. https://doi.org/10.1080/10447318.2024.2383033.

Wang L, Zhang S and Naeem SB (2024b) Modeling the predictors of health information avoidance behavior: Implications from the stimulus organism response (S-O-R) theory. *Journal of Librarianship and Information Science*: 09610006241290265. https://doi.org/10.1177/09610006241290265.

West SG, Finch JF and Curran PJ (1995) Structural equation models with nonnormal variables: Problems and remedies.

Wu PF, Summers C, Panesar A, et al. (2024) AI Hesitancy and acceptability—perceptions of AI chatbots for chronic health management and long COVID support: Survey study. *JMIR Human Factors* 11: e51086–e51086.

Yuan K-H, Bentler PM and Zhang W (2005) The effect of skewness and kurtosis on mean and covariance structure analysis: The univariate case and its multivariate implication. *Sociological Methods & Research* 34(2): 240–258.

Zhang J, Oh YJ, Lange P, et al. (2020) Artificial intelligence chatbot behavior change model for designing artificial intelligence chatbots to promote physical activity and a healthy diet. *Journal of Medical Internet Research* 22(9): e22845.

Zhang P and Kamel Boulos MN (2023) Generative AI in medicine and healthcare: Promises, opportunities and challenges. *Future Internet* 15(9): 86.

Zhao B-Y, Chen M-R, Lin R, et al. (2024) Influence of information anxiety on core competency of registered nurses: Mediating effect of digital health literacy. *BMC Nursing* 23(1): 1–11.

(2) The Hlealth Risks of Information Avoidance: A RISP Perspective (B 类)

DE GRUYTER LIBRI 2025; 75(3): 219–234

Yang Liu*, Fatma Mabrouk, Anas Ali Alhur and Salman Bin Naeem

The Health Risks of Information Avoidance: A RISP Perspective

https://doi.org/10.1515/libri-2024-0177
Received November 9, 2024; accepted May 20, 2025;
published online July 28, 2025

Abstract: The study aimed to measure and validate the risk information seeking and processing (RISP) model among university students, exploring the factors that predict health information avoidance behaviors and their association with health risk behaviors. A cross-sectional survey was conducted to collect the data from 1,500 university students. A five-factor measure model (risk perception, informational norms, information overload, information insufficiency, and negative affective risk responses) was developed and tested using structural equation modelling (SEM). The findings revealed that risk perception, information overload, and negative affective risk responses significantly influence health information avoidance behavior, which in turn significantly impacts health risk behaviors. These results highlight the importance of health literacy programs in reducing risk perception, information overload, and negative affective responses while promoting health information-seeking behaviors. The study contributes to the existing body of knowledge by identifying key factors within the RISP model that significantly influence health information avoidance. Moreover, these findings can guide the development of targeted interventions aimed at reducing health information avoidance and promoting health-seeking behaviors.

***Corresponding author: Yang Liu**, Library, South China Agricultural University, Guangzhou, 510642, China; and Faculty of Data Science, City University of Macau, Macau, China, E-mail: liuy@scau.edu.cn
Fatma Mabrouk, Department of Economics, College of Business Administration, Princess Nourah Bint Abdulrahman University, P.O. Box 84428, Riyadh 11671, Saudi Arabia, E-mail: FMMabrouk@pnu.edu.sa. https://orcid.org/0000-0002-1300-0494
Anas Ali Alhur, Department of Health Informatics, College of Public Health and Health Informatics, University of Hail, Hail, Saudi Arabia; and Department of Health Information Management and Technology, College of Public Health, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia, E-mail: anas.ali.alhur@gmail.com
Salman Bin Naeem, Department of Information Management, The Islamia University of Bahawalpur, Bahawalpur, Pakistan, E-mail: salman.naeem@iub.edu.pk

Keywords: information behavior; information overload; health information avoidance; the risk information seeking and processing (RISP) model; health literacy; risk behaviors

1 Introduction

Information-seeking behavior is typically associated with the active search for information to solve problems and make informed decisions. However, the phenomenon of information avoidance is increasingly recognized as a significant factor influencing information behavior, contrasting with the traditional focus on information-seeking (Zimmerman and Shaw 2020). Traditional information-seeking theories (Ellis 1989; Kuhlthau 1993; Wilson 1999) primarily focused on information-seeking processes, often overlooking the complex interplay between seeking and avoidance. More recent research highlights the importance of understanding the conditions under which individuals choose to avoid rather than seek information (Tretter and Löffler-Stastka 2024). There are several factors reported in the literature which cause individuals to deliberately avoid information, including emotional factors, cognitive dissonance, and uncertainty management (Howell et al. 2020). For example, people often avoid information that induces anxiety or challenges their self-perception (Naderbeigi et al. 2020). Moreover, health information avoidance is influenced by various factors, including perceived health threats, perceived irrelevance of information, social pressure, cognitive biases, emotional responses, information overload, environmental factors, and cultural beliefs (Subagyo and Irwansyah 2021; Sairanen and Savolainen 2010; Metzger et al. 2020; Kim and Hwang 2022; Soroya and Faiola 2023). This highlights the role of internal psychological processes in shaping information behavior. Table 1 provides a basic comparison between information-seeking and avoidance.

1.1 Information Avoidance and Risk Behaviors

Avoidance behavior redirects individuals from seeking information that presents risks or threats, while the term

Open Access. © 2025 the author(s), published by De Gruyter. This work is licensed under the Creative Commons Attribution 4.0 International License.

Table 1: Comparison of information seeking and avoidance.

Feature	Information seeking	Information avoidance	Sources
Motivation	Curiosity, problem-solving, decision-making	Fear, anxiety, emotional well-being, uncertainty management	Zimmerman and Shaw (2020), McQueen et al. (2013), and Soroya et al. (2021)
Behavior	Active search, exploration	Deliberate avoidance, ignoring	
Outcome	Increased knowledge, informed decisions	Reduced anxiety (short term), maintained emotional state (short-term), potential for negative consequences like missed opportunities for prevention	

"delay" in avoidance suggests a temporary postponement of information to facilitate self-regulation of emotions and beliefs regarding information acquisition or rejection (Liu et al. 2021; Narayan et al. 2011). Information avoidance behavior can be particularly high or relatively low depending on the specific circumstances. For example, patients with chronic diseases are more likely to avoid information than those with other diseases (He and Li 2021). Information avoidance can have negative health consequences, leading to lower rates of preventive measures and increased healthcare costs and hospitalizations. The COVID-19 pandemic highlighted the prevalence of health information avoidance across various populations and settings (Link 2021; Li 2023; Kim et al. 2020; Conway et al. 2022; Chen et al. 2022). While the risk of COVID-19 was associated with increased information avoidance (Zhang et al. 2022b), fear and anxiety related to serious health concerns are also strong predictors of avoidance (Yang et al. 2023).

De Pasquale et al. (2021) suggest that disease cues and threats can amplify avoidance behaviors, leading to poor health outcomes. However, accessing healthcare information from various sources can positively influence individuals' beliefs about disease prevention and health risks (He and Li 2021). Avoiding healthcare or delaying treatments can result in poor health outcomes (Orom et al. 2018; Vu et al. 2023). Several studies correlate avoiding health information with negative health consequences (Vrinten et al. 2018; Spleen et al. 2014). Individuals may avoid information due to fear of negative disease outcomes, a desire to maintain self-efficacy, or anxiety related to serious diagnoses (St. Jean et al. 2017; Song et al. 2021). Demographic factors, including age, gender, educational level, socioeconomic status, and geographic location, can influence health information-seeking behavior across different cultures or settings (Ittefaq et al. 2022; Ek and Heinström 2011).

1.1.1 Risk Perception, Information Norms, Negative Affective Risk Responses, and Health Information Avoidance

Health risk messages positively influence consumers' health decisions regarding critical health issues (Rubin et al. 2020). However, a lack of information can compromise health services and infrastructure trust (Soares et al. 2021). Consumers with lower educational levels and older individuals tend to perceive greater disease risks and exhibit more avoidance behavior than younger, more educated populations (Splinter et al. 2021). Moreover, a study found that college students' health behavior is impacted by their unhealthy dietary habits, poor lifestyle choices, and inadequate health management strategies, which gradually develop habits of health information avoidance (Zhang et al. 2022a).

On the other hand, perceived disease risk can encourage preventive behaviors, promoting individuals to seek health information, utilize healthcare services, and adhere to treatment plans (Meng et al. 2023; Kim and Chung 2023). This proactive approach reduces negative emotions, minimizes avoidance, and enhances self-efficacy. Risk perception also strengthens health beliefs about information-seeking (Popovic et al. 2020).

Workplace environment, lack of control over health problems, and negative health emotions can cause psychological distress and risky health behaviors (Benishek et al. 2023). Additionally, research suggests that cultural and social factors can positively and negatively influence health risk behaviors (Samadipour et al. 2023; Liu and Yang 2023).

Social influences from different cultures and norms can have a varied impact on individuals' health behaviors (Qu et al. 2023). For example, informational norms can be divided into two sub-norms, i.e., descriptive and injunctive. The descriptive norms involve collective responses of individuals towards health behavior. In contrast, injunctive norms explain that individuals accept or reject health information because of social involvement and the influence of others (Qu et al. 2023). Another study reported that social pressure can reduce health information avoidance (Zhou and Xie 2024), whereas individuals with limited social networks are more likely to avoid health information compared to those who are more socially engaged (Na et al. 2023; Yildirim et al. 2023).

1.1.2 Information Overload, Information Insufficiency, and Health Information Avoidance

Several studies show that information overload is positively associated with individual health information anxiety and negatively with information insufficiency levels (Link 2021; Ahn and Kahlor 2023). Consumers exposed to health information overload may experience increased anxiety and be more likely to avoid such information (Misra and Stokols 2012; Li 2023). Information overload has a twofold influence on information insufficiency. For instance, when consumers seek health information up to a certain limit, known as a threshold level, it reduces the information insufficiency gap and positively influences individuals' health beliefs. However, exceeding this "consumption threshold" level can negatively influence individuals' health beliefs and demonstrate higher avoidance behavior (Huang et al. 2016). Thus, seeking health information can be beneficial. On the other hand, encountering excessive amounts can lead to information overload, anxiety, and ultimately avoidance behavior (Jensen et al. 2020; Soroya et al. 2021; Addison 2017).

Several studies have indicated that low health literacy and low level of education contribute to information insufficiency, which further encourages the prevalence of health information avoidance behavior (Toapanta et al. 2023; Berkman et al. 2011; Hwang and Jeong 2016).

1.2 The Theoretical Framework and the Development of Hypotheses

The risk information-seeking and processing framework is mostly used to examine an individual's health information behavior as well as to determine how individuals respond to health threat cues (Griffin et al. 2013). The RISP model is grounded on the Heuristic model (Gigerenzer and Gaissmaier 2011) and the theory of planned behavior (Ajzen 2011). The RISP framework highlights the significance of factors predicting changes in an individual's attitudes, beliefs, and perceptions towards health information avoidance behavior, which further leads to poor health outcomes, i.e., health risk behavior (Link 2021; Zhou et al. 2023). The RISP framework hypothesizes that an individual's health information avoidance behavior is influenced by risk perception, informational norms, information overload, information insufficiency, and negative affective risk responses (Deline and Kahlor 2019). Health consumers use both information-seeking and avoidance behaviors, driven by cognitive processes, to manage health threats and uncertainties (Li 2023). Past studies used the RISP framework to understand information behavior, especially health risk behavior among different settings and populations (Link 2021; Kim and Hwang 2022; Zhou et al. 2023). Moreover, the research studies carried out during the pandemic period also used the RISP framework to examine health risk behavior (Kim et al. 2020; Ford et al. 2023; Park et al. 2023; Hwang and Jeong 2020; Link 2021; Zhou et al. 2023). Thus, we chose the Planned Risk Information Avoidance (PRIA) Model, which is the sub-model of the RISP framework, as it aligns well with the specific behavior under investigation: student avoidance of health information. To further explore health consequences, we added a new construct – health risk behavior – as an outcome variable (as shown in Figure 1).

1.3 Objectives and Hypotheses of the Study

A comprehensive understanding of the prevalence and determinants of information avoidance behavior is important, as it negatively impacts consumer health outcomes. Therefore, this study investigates the relationship between various determinants and general health information avoidance behavior among university students in Azad Jammu and Kashmir (AJ&K), using risk perception, information norms, information overload, etc. (as shown in Figure 1) as a guiding framework. The focus of this research is on general health information avoidance and risk behavior, rather than a specific health risk like environmental exposure and skin cancer prevention.

1.3.1 Objectives of the Study

- To measure and validate the risk information seeking and processing (RISP) model among university students.
- To identify key determinants of general health information avoidance behavior and its subsequent influence on health risk behaviors.

1.3.2 Hypotheses of the Study

The following eight hypotheses are proposed based on the RISP conceptual framework (as shown in Figure 1).

H_1. Risk perception has a significant influence on health information avoidance.

H_2. Risk perception has a significant influence on negative affective risk responses.

H_3. Informational norms have a significant influence on health information avoidance.

H_4. Information overload has a significant influence on information insufficiency.

H_5. Information overload has a significant influence on health information avoidance.

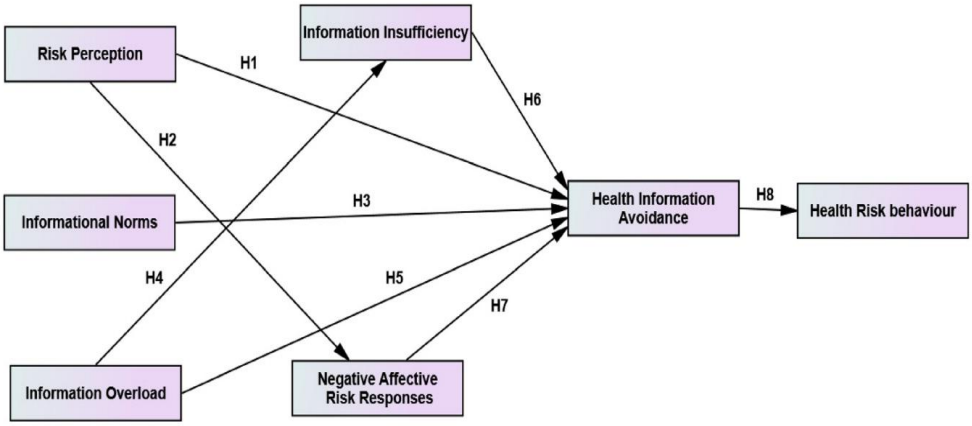


Figure 1: The RISP-based conceptual framework and the development of hypotheses.

H_6. Information insufficiency has a significant influence on health information avoidance.

H_7. Negative affective risk responses have a significant influence on health information avoidance.

H_8. Health information avoidance has a significant influence on health risk behavior.

2 Research Methodology

A cross-sectional survey was conducted among students (of both genders) enrolled in the five public universities of Azad Jammu and Kashmir: University of Azad Jammu & Kashmir, Muzaffarabad; Mirpur University of Science and Technology; University of Poonch Rawalakot; Women University Bagh; and University of Kotli. Azad Jammu and Kashmir, also known as AJK, is a territory administered by Pakistan as a nominally self-governing entity. It is located in the western part of the Kashmir region, which has been a source of conflict between India and Pakistan since 1947. More than 70 % of the people of AJ&K are educated (Snedden 2023; Shahzad et al. 2016).

2.1 Research Tool

A questionnaire was developed after reviewing relevant literature to study factors influencing health information avoidance behavior (Kahlor 2010; Song et al. 2021; Soroya et al. 2021; Zhao and Liu 2021; Link 2021). The questionnaire uses close-ended questions to gather data and consists of two parts. Part 1 focuses on collecting demographic information related to study respondents, i.e., age, gender, education level, area, health status, etc. Part 2 assesses factors (e.g., risk perception, information overload, information norms) related to the risk information seeking and processing (RISP) model (see detail in Table 4) using a 5-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). The factors "information overload" and "negative affective risk responses" were estimated using five items under each factor. The factors "informational norms," "information insufficiency," and "health risk behavior" were measured using four statements each. The factor "risk perception" was measured using six items. However, the factor "health information avoidance behavior" was assessed using seven question statements. On the whole, the instruments comprised seven factors and 35 items.

2.2 Data Collection Process

Data collection occurred between May 2024 and July 2024. A total of 3,500 copies of the questionnaire were distributed among the students in the five public sector universities of AJ&K using purposive sampling. These questionnaires were given to them personally in classrooms, cafeterias, and departmental libraries, as well as in central libraries. Furthermore, an online version of the questionnaire was prepared using Google Forms, and its link was shared with only those respondents who preferred the online mode. Of the 3,500 distributed questionnaires, 1,587 were returned (45.3 % response rate). After discarding 87 incorrect and incomplete responses, 1,500 responses were finalized for data analysis purposes.

2.3 Reliability and Validity Measures

The questionnaire's reliability and validity were ensured through a multi-step process. Three experts from information management, health communication, and public health reviewed the questionnaire and suggested revisions, which were incorporated. These revisions were mainly related to the deleting of a few overlapping items, avoidance of jargon, and double-barreled questions. Next, the internal consistency of the instrument was assessed using Cronbach's Alpha with SPSS software. The overall Cronbach's alpha for the 35 items under seven constructs was 0.708, demonstrating good reliability, with acceptable values typically above 0.7 (Bujang et al. 2018). Table 2 details the Cronbach's alpha values for each construct measured in the study.

2.3.1 Construct Reliability and Validity

We employed Composite Reliability (CR) and Maximal Reliability MaxR(H) to assess reliability. The CR values for latent constructs RIS (0.736), IFN (0.747), and IFO (0.632) were calculated. While RIS and IFN met the acceptable threshold of 0.7, IFO fell slightly below this criterion. However, the MaxR(H) value for IFO (0.717) indicated acceptable reliability. Overall, the MaxR(H) values for all constructs ranged from 0.717 to 0.824, suggesting good construct validity.

2.3.2 Univariate and Multivariate Normality Assessment

Both univariate and multivariate normality were assessed using skewness and kurtosis. Initial analysis indicated few variables were significant departures from normality. To address this, outliers identified through Mahalanobis distance were removed. Post-outlier removal, all variables met the accepted thresholds for skewness (<0.3) and kurtosis (<0.7), indicating improved normality (West et al. 1995).

Table 2: Cronbach alpha coefficients value.

Sr. no	Constructs	No. of items	Cronbach's alpha
1	Risk perception (RIS)	06	0.797
2	Informational norms (IFN)	04	0.822
3	Information overload (IFO)	05	0.709
4	Information insufficiency (INI)	04	0.718
5	Negative affective risk response (NAR)	05	0.735
6	Health information avoidance (HIA)	07	0.716
7	Health risk behavior (HRB)	04	0.823

2.4 Data Analysis Procedure

The data analysis was performed through the Statistical Package for Social Sciences (SPSS software v26) software. Demographic information of the respondents was presented in Table 3 using frequencies and percentages. Chi-square statistics were applied to assess gender differences across various demographic categories, including respondents' age, qualification level, discipline of study, geographical location, and health status. The analysis of moment structures (AMOS software version 22) was used to perform confirmatory factor analysis (CFA) and structural equation modeling (SEM) analysis. The CFA was conducted to determine the correlation between latent variables, estimate how well the questionnaire items represent the underlying constructs of the RISP framework, and validate the measurement model. However, CFA does not measure the correlation between the latent variables themselves. Therefore, the SEM was applied to examine the direct and indirect relationship between the constructs, testing the proposed hypotheses within the RISP framework (as shown in Figure 1). The significance level of alpha <0.05 was used (Table 4).

2.5 Ethical Approval

Ethical approval for this study was obtained from the Departmental Research Committee (DRC) at The Islamia University of Bahawalpur, Pakistan. Participants were informed about the study objectives and provided informed consent before data collection began. Their participation was voluntary, and they could withdraw from the study at any stage without justification.

3 Results

3.1 Demographic Information

Gender-wise comparisons were conducted to assess potential demographic disparities and ensure the sample's representativeness. While gender was not a primary focus of this study, such analyses align with best practices for reporting sample characteristics and help better understand the sample distribution pattern across different groups, such as age, qualification, discipline, location, and health status. Of the 1,500 respondents, the majority were female (n = 794 or 52.9 %), and the remainder were male (n = 706 or 47.1 %). A statistically significant gender difference was observed across age groups (χ^2 = 26.559, p = 0.000, phi's value = 0.133).

Table 3: Respondents' demographic information.

	Male	Female	χ^2 value	*p*-Value	Phi/ Cramer's *V*
Age					
Below 20 years	36 (5.1 %)	76 (9.6 %)	26.559	0.000	0.133
21–30 years	313 (44.3 %)	380 (47.9 %)			
31–40 years	252 (35.7 %)	274 (34.5 %)			
Above 41 years	105 (14.9 %)	64 (8.1 %)			
Total	706 (47.1 %)	794 (52.9 %)			
Qualification					
BS/Master (16 years)	412 (58.4 %)	485 (61.1 %)	5.483	0.140	0.060
MPhil/MS (18 years)	239 (33.9 %)	260 (32.7 %)			
PhD	55 (7.8 %)	46 (5.8 %)			
Any other	5 (0.7 %)	4 (0.5 %)			
Total	706 (47.1 %)	794 (52.9 %)			
Discipline					
Sciences	273 (38.7 %)	250 (31.5 %)	23.447	0.000	0.125
Social Sciences	248 (35.1 %)	261 (32.9 %)			
Arts and Humanities	183 (25.9 %)	266 (33.5 %)			
Any other	2 (0.3 %)	17 (2.1 %)			
Total	706 (47.1 %)	794 (52.9 %)			
Location					
Rural	380 (53.8 %)	412 (51.9 %)	0.757	0.685	0.022
Urban	325 (46.1 %)	380 (47.9 %)			
Total	706 (47.1 %)	794 (52.9 %)			
Health status					
Extremely bad	7 (1 %)	2 (3 %)	12.325	0.006	0.091
Relatively bad	100 (14.2 %)	134 (16.9 %)			
Normal	564 (79.9 %)	593 (74.7 %)			
Extremely good	35 (5 %)	65 (8.2 %)			
Total	706 (47.1 %)	794 (52.9 %)			

However, no significant gender differences were found in terms of educational qualifications ($\chi^2 = 5.483$, $p = 0.140$, phi's value = 0.060) or place of residence (rural/urban) ($\chi^2 = 0.757$, $p = 0.685$, phi's value = 0.022), while a statistically significant difference was observed in the distribution of male and female respondents across different disciplines ($\chi^2 = 23.447$, $p = 0.000$, phi's value = 0.125). Moreover, a significant gender difference was found in terms of self-reported health status ($\chi^2 = 12.325$, $p = 0.006$, phi's value = 0.091) (as shown in Table 3).

The respondents were asked to respond to six statements to measure their risk perception regarding "information overload" (Table 4). All these statements received a mean score of around 4, indicating that the majority of respondents agree with these statements e.g., they think health information overload can put their health at risk ($M = 3.97$, SD = 0.620), and information overload can be a very serious threat to their quality of life ($M = 3.87$, SD = 0.660). "Information norms" were measured using four statements, three of which received a mean score of around 4, showing that the majority of the respondents agreed with them, for example, "others expect me to seek information about my health" ($M = 4.05$, SD = 0.704), and "society expects that I should seek information about my health" ($M = 4.02$, SD = 0.659). However, one statement, "people in my life whose opinions I value avoid seeking information about their health," received a mean score ($M = 2.09$, SD = 0.692), indicating that the majority of the respondents disagreed with it. This statement was reverse coded because the first three items in the information norms scale reflected norms to seek information, whereas this statement references a norm to avoid information.

"Information overload" was measured using five statements, all of which received a mean score of around 4, indicating that the majority of the respondents agreed with them, for example, "I have trouble making health-related decisions because of the abundance of information to consider" ($M = 4.07$, SD = 0.661), and "I have trouble choosing what is important and what is not out from the flood of information related to health" ($M = 4.03$, SD = 0.599) (as shown in Table 4). "Information insufficiency" was measured using four statements, all of which obtained a mean value of around 4, showing that respondents agreed with these statements e.g., "I have difficulty finding health information that is relevant to my specific needs" ($M = 4.07$, SD = 0.649) and "I believe that more accessible and user-friendly health information resources are needed" ($M = 4.09$, SD = 0.721). "Health information avoidance" was

Table 4: Descriptive statistics of health information avoidance constructs (N = 1,500).

Code	statements	Mean	SD	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Risk perception (RIS)								
RP1	I think health information overload can put my health at risk.	3.97	0.620	6 (0.4 %)	53 (3.5 %)	113 (7.5 %)	1,130 (75.3 %)	198 (13.2 %)
RP2	I think health information overload is a serious threat to my quality of life.	3.87	0.660	22 (1.5 %)	33 (2.2 %)	115 (7.7 %)	1,122 (74.8 %)	208 (13.9 %)
RP3	I think health information overload can be harmful to my well-being.	4.03	0.629	5 (3 %)	47 (3.1 %)	102 (6.8 %)	1,086 (72.4 %)	260 (17.3 %)
RP4	Thinking about health issues is negative; my fears are dangerous for me.	4.04	0.658	10 (7 %)	48 (3.2 %)	95 (6.3 %)	1,073 (71.5 %)	274 (18.3 %)
RP5	I think seeking health-related information from the Internet can have adverse effects on my health.	3.96	0.768	24 (1.6 %)	56 (3.7 %)	165 (11 %)	972 (64.8 %)	283 (18.9 %)
RP6	I think health information overload can put my health at risk.	4.18	0.677	7 (5 %)	45 (3 %)	54 (3.6 %)	954 (63.6 %)	440 (29.3 %)
Informational norms (IFN)								
INN1	Society expects that I should seek information about my health.	4.02	0.659	8 (5 %)	66 (4.4 %)	64 (4.3 %)	1,111 (74.1 %)	251 (16.7 %)
INN2	My dear ones think that I should seek information about my health.	4.01	0.745	43 (2.9 %)	20 (1.3 %)	89 (5.9 %)	1,072 (71.5 %)	276 (18.4 %)
INN3	Others expect me to seek information about my health.	4.05	0.704	13 (9 %)	62 (4.1 %)	71 (4.7 %)	1,042 (69.5 %)	312 (20.8 %)
INN4	People in my life whose opinions I value avoid seeking information about their health.	2.09	0.692	347 (23.1 %)	1,018 (67.9 %)	67 (4.5 %)	59 (3.9 %)	9 (6 %)
Information overload (IFO)								
IO1	When I search for health information, I usually get too much rather than too little information.	3.89	0.518	3 (0.2 %)	40 (2.7 %)	155 (10.3 %)	1,224 (81.6 %)	78 (5.2 %)
IO2	I am often distracted by the amount of information on multiple channels/sources (TV, Internet, Magazines etc.) about health.	3.93	0.592	12 (0.8 %)	29 (1.9 %)	159 (10.6 %)	1,151 (76.7 %)	149 (9.9 %)
IO3	I always feel overwhelmed by the flood of health information available to me through social networking sites.	3.93	0.646	9 (0.6 %)	46 (3.1 %)	176 (11.7 %)	1,078 (71.9 %)	191 (12.7 %)
IO4	I have trouble choosing what is important and what's not out from the flood of information related to health.	4.03	0.599	8 (0.5 %)	29 (1.9 %)	114 (7.6 %)	1,112 (74.1 %)	237 (15.8 %)
IO5	I have trouble making health-related decisions because of the abundance of information to consider.	4.07	0.661	6 (0.4 %)	51 (3.4 %)	91 (6.1 %)	1,038 (69.2 %)	314 (20.9 %)
Information insufficiency (INI)								
INI1	I have difficulty finding health information that is relevant to my specific needs.	4.07	0.649	3 (0.2 %)	55 (3.7 %)	85 (5.7 %)	1,050 (70 %)	307 (20.5 %)
INI2	I believe that more accessible and user-friendly health information resources are needed.	4.09	0.721	25 (1.7 %)	20 (1.3 %)	121 (8.1 %)	970 (64.7 %)	364 (24.3 %)
INI3	I feel that inadequate health information has negatively affected my health-related decisions.	4.12	0.675	7 (5 %)	40 (2.7 %)	101 (6.7 %)	973 (64.9 %)	379 (25.3 %)
INI4	I believe that improved health literacy skills will help me seek relevant health information.	4.25	0.729	14 (0.9 %)	43 (2.9 %)	46 (3.1 %)	853 (56.9 %)	544 (36.3 %)
Negative affective risk responses (NAR)								
NARR1	I avoid health information that might make me upset.	4.02	0.648	5 (3 %)	54 (3.6 %)	124 (8.3 %)	1,073 (71.5 %)	244 (16.3 %)
NARR2	I tend to ignore news or updates related to health that have the potential to increase my stress levels.	3.98	0.686	29 (1.9 %)	16 (1.1 %)	173 (9.5 %)	1,075 (71.7 %)	237 (15.8 %)
NARR3	When faced with potentially distressing health information, I prefer not to confront it.	4.01	0.625	3 (0.2 %)	48 (3.2 %)	125 (8.3 %)	1,083 (72.2 %)	241 (16.1 %)
NARR4	I often choose not to seek out health information that could lead to negative emotions.	4.03	0.644	13 (0.9 %)	34 (2.3 %)	106 (7.1 %)	1,083 (72.2 %)	264 (17.6 %)
NARR5	I avoid discussing or reading about health topics that might make me feel anxious.	4.09	0.662	10 (0.7 %)	41 (2.7 %)	84 (5.6 %)	1,033 (68.9 %)	332 (22.1 %)

Table 4: (continued)

Code	statements	Mean	SD	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Health information avoidance (HIA)								
HIAv1	I avoid reading public health messages due to the flood of health messages.	3.95	0.400	5 (0.3 %)	25 (1.7 %)	79 (4.6 %)	13,325 (88.8 %)	59 (3.9 %)
HIAv2	I avoid health messages due to my low level of understanding of health terminology and understanding of health information.	4.11	0.569	8 (5 %)	9 (6 %)	91 (6.1 %)	1,089 (72.6 %)	302 (20.1 %)
HIAv3	I intentionally avoid looking at websites or blogs about health.	4.01	0.550	5 (0.3 %)	22 (1.5 %)	122 (8.1 %)	1,152 (76.8 %)	199 (13.3 %)
HIAv4	I try to pay as little attention as possible to private messages (e.g., via WhatsApp) from family and friends about health.	4.09	0.581	7 (0.5 %)	18 (1.2 %)	96 (64.4 %)	1,092 (72.8 %)	287 (19.1 %)
HIAv5	I lack the required competency to find the related health information from a flood of health information.	4.13	0.591	5 (0.3 %)	24 (1.6 %)	75 (5 %)	1,064 (70.9 %)	332 (22.1 %)
HIAv6	I feel healthy; therefore, I avoid seeking health information.	4.03	0.592	6 (0.4 %)	24 (1.6 %)	134 (8.9 %)	1,096 (73.1 %)	239 (15.9 %)
HIAv7	I avoid health information online because I think information is not accurate/transparent/trustworthy.	4.39	0.618	5 (0.3 %)	15 (1 %)	31 (2.1 %)	784 (52.3 %)	664 (44.3 %)
Health risk behavior (HRB)								
HRB1	I think avoiding health information is dangerous for my health.	4.01	0.766	18 (1.2 %)	80 (5.3 %)	87 (5.8 %)	1,004 (66.9 %)	311 (20.7 %)
HRB2	I think avoiding health information can make it difficult to learn about new treatment options, manage symptoms, or understand potential complications.	3.99	0.826	48 (3.2 %)	37 (2.5 %)	120 (8.0 %)	973 (64.9 %)	322 (21.5 %)
HRB3	I think health information avoidance behavior contributes to engaging in riskier health behaviors.	4.09	1.10	23 (1.5 %)	63 (4.2 %)	88 (5.9 %)	939 (62.6 %)	386 (25.7 %)
HRB4	I think social media platforms and the spread of misinformation online contribute to health information avoidance and subsequent risk behaviors.	4.00	0.799	33 (2.2 %)	63 (4.2 %)	92 (6.1 %)	996 (66.4 %)	316 (21.1 %)

measured using seven statements, all of which obtained a mean score of around 4, indicating that the majority of respondents agreed with these statements, e.g., "I avoid health information online because I think information is not accurate/transparent/trustworthy" (M = 4.39, SD = 0.618) and "I avoid reading public health messages due to the flood of health messages" (M = 3.95, SD = 0.400). "Health risk behavior" was measured using four statements, all of which obtained a mean value around 4, showing the majority of the respondent agreed with these statements, e.g., "I think health information avoidance behavior contributes to engaging in riskier health behavior" (M = 4.09, SD = 1.10) and "I think social media platforms and the spread of misinformation online contribute to health information avoidance and subsequent risk behavior" (M = 4.00, SD = 0.799) (Table 4).

3.2 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was employed to assess the validity of the measurement model comprising seven constructs: risk perception (RIS); informational norms (IFN); information overload (IFO); information insufficiency (INI); negative affective risk responses (NAR); health information avoidance (HIA); and health risk behavior (HRB).

3.2.1 Regression Weights

Figure 2 illustrates the factor loadings of the measurement model. Loadings for all latent variables – RIS, IFN, IFO, INI, NAR, HIA, and HRB – ranged from β = 0.49 to β = 0.76, indicating moderate to high relationships with their respective latent variables. While the majority of loadings fell within the acceptable range of 0.50 or above, HIA showed slightly lower loadings (β = 0.49–0.56). Overall, the model demonstrates a good fit with the data.

3.2.2 Estimation of Correlation

Figure 2 presents the correlation matrix among the seven latent variables – RIS, IFN, IFO, INI, NAR, HIA, and HRB. The latent variable RIS demonstrated positive but weak strength

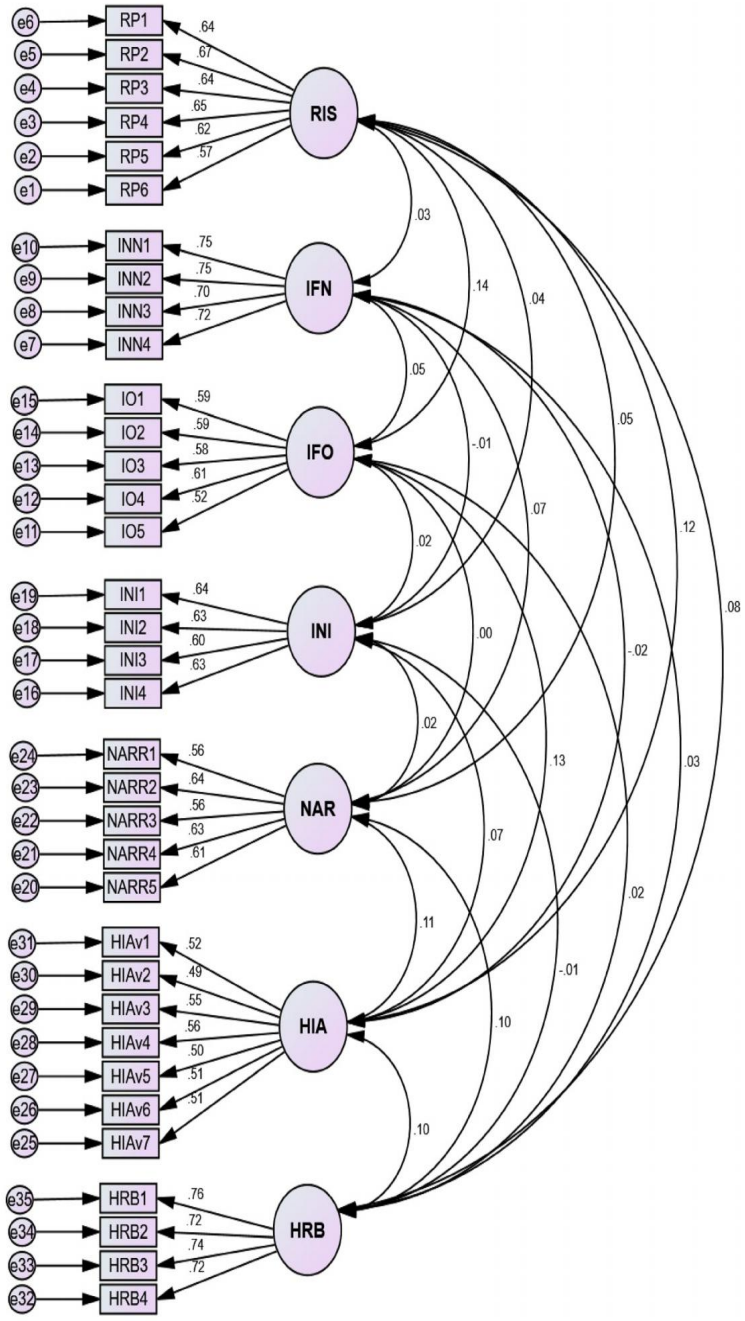


Figure 2: Confirmatory factor analysis (CFA) estimates the latent variables.

of correlation with IFO (β = 0.14), INI (β = 0.04), NAR (β = 0.05), HIA (β = 0.13), and HRB (β = 0.08). IFN showed a weak positive correlation with NAR (β = 0.07), IFO (β = 0.05), and HRB (β = 0.25) but a weak negative correlation with HIA (β = –0.02) and INI (β = –0.007). IFO exhibited weak positive correlations with INI (β = 0.02), HIA (β = 0.13), and HRB (β = 0.03).

Table 5: Model fit indices.

Model fit indices	χ^2	DF	IFI	TLI	CFI	GFI	NFI	RMSEA
Acceptable fit[a]	$\chi^2 \leq 3$	DF	IFI ≥ 0.90	TLI ≥ 0.90	CFI ≥ 0.90	GFI ≥ 0.90	NFI ≥ 0.90	RMSEA ≤ 0.08
Model fit values	1.455	539	0.979	0.976	0.979	0.979	0.935	0.017

[a]Cutoff values for fit indices (Hu and Bentler 1999).

Moreover, INI demonstrated a weak positive correlation with HIA (β = 0.07) and a negative correlation with HRB (β = −0.005). However, HIA showed a weak positive correlation with HRB (β = 0.10).

3.2.3 Model Fit Indices

Table 5 presents the model fit indices of the CFA model. The Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Normed Fit Index (NFI) all exceed the recommended threshold of 0.90, suggesting a good fit. Additionally, the Root Mean Square Error of Approximation (RMSEA) of 0.017 falls well below the acceptable limit of 0.08, further supporting the model's adequacy.

3.3 Structural Equation Model

Structural equation modeling (SEM) was employed to examine the hypothesized relationship among the constructs within the RISP framework (as shown in Figure 1). Figure 3 displays the standardized path coefficients for the structural model. The path coefficient loadings for all constructs ranged from β = 0.49 to β = 0.76, suggesting adequate construct validity. The loading values for IFO and NAR

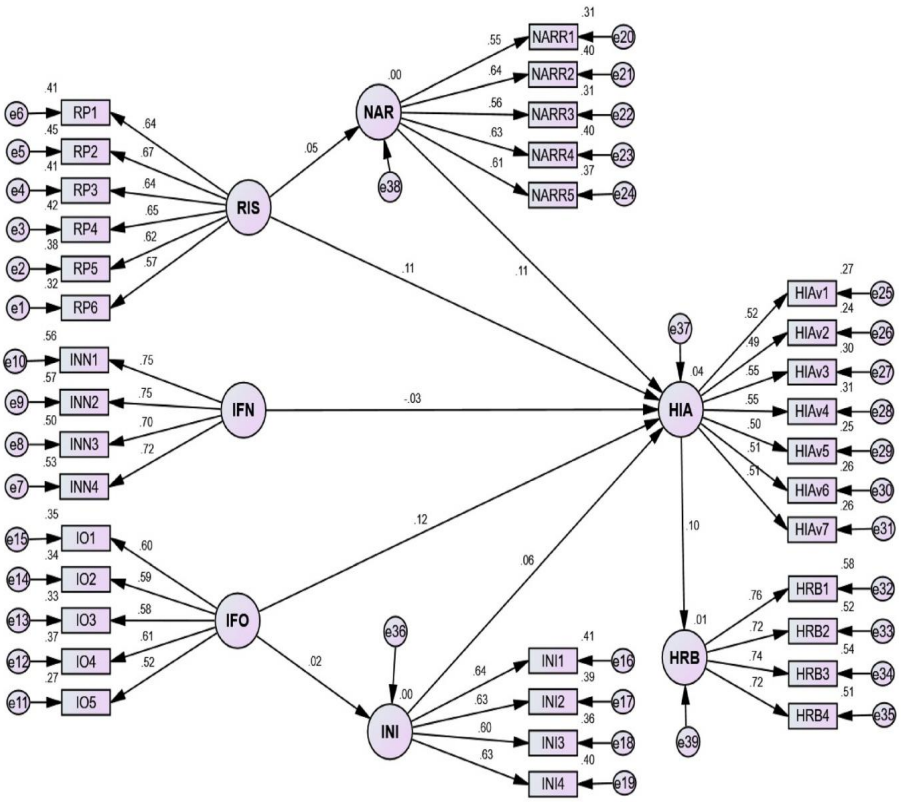


Figure 3: Structural equation model: Measuring determinants of health information avoidance and its impact on risk behaviors. Constructs: risk perception (RIS), informational norms (IFN), information overload (IFO), information insufficiency (INI), negative affective risk responses (NAR), health information avoidance (HIA), health risk behavior (HRB). See detail in Table 4 for survey questions.

ranged from $\beta = 0.55$ to $\beta = 0.64$, indicating good loadings on their respective constructs. IFN, INI, and HRB demonstrated acceptable loadings with values between $\beta = 0.50$ and $\beta = 0.76$. RIS and HIA exhibited moderate to high loadings, ranging from $\beta = 0.49$ to $\beta = 0.67$.

The SEM analysis indicated that INI and NAR partially mediate the relationship between IFO, RIS, and HIA. Path coefficient estimation revealed that RIS positively influenced both NAR ($\beta = 0.5$) and HIA ($\beta = 0.11$), while IFO positively influenced INI ($\beta = 0.02$) and HIA ($\beta = 0.12$). On the other hand, IFN exhibited a negative influence on HIA ($\beta = -0.03$). Additionally, both INI ($\beta = 0.06$) and NAR ($\beta = 0.11$) positively influenced HIA, which subsequently had a positive impact on HRB ($\beta = 0.10$).

3.3.1 Multiple Squared Correlations

The SEM analysis further examined the proportion of variance in HIA explained by other constructs (INI, RIS, IFN, IFO, NAR, and HBR). The results indicate that HIA accounted for 4 % of the total variance in the model (Figure 3).

3.3.2 Standardized Estimation of Regression Weights and Validation of the Hypotheses

Table 6 presents the results of hypothesis tests for the proposed relationship among the latent variables in the structural equation model (SEM). Standardized regression estimates were used to assess the strength and direction of these relationships, with standard errors (SE) determining the variability of estimates. Critical ratios (CR), calculated by dividing estimates by standard errors, were used to evaluate statistical significance. Table 6 provides test values for eight hypotheses (H1–H8) regarding the relationship between different variables. A p-value less than 0.05 indicated statistical significance.

The SEM analysis revealed that RIS ($\beta = 0.058$, $p < 0.05$), IFO ($\beta = 0.074$, $p < 0.05$), and NAR ($\beta = 0.060$, $p < 0.05$) had significant positive influence on HIA. Additionally, HIA significantly influenced HRB ($\beta = 0.283$, $p < 0.05$). RIS, however, had no significant effect on NAR ($\beta = 0.044$, $p > 0.05$). IFO did not significantly influence INI ($\beta = 0.023$, $p > 0.05$), INI did not significantly influence HIA ($\beta = 0.032$, $p > 0.05$), and IFN ($\beta = -0.013$, CR = −0.986, $p > 0.05$) had a non-significant negative effect on HIA.

Table 6: Validation of the hypotheses.

	Factor	Estimate	S.E.	C.R.	*p*-Value	Result
H1	RIS → HIA	0.058	0.018	3.155	0.002	Accepted
H2	RIS → NAR	0.044	0.032	1.387	0.166	Rejected
H3	IFN → HIA	−0.013	0.014	−0.984	0.325	Rejected
H4	IFO → INI	0.023	0.044	0.518	0.604	Rejected
H5	IFO → HIA	0.074	0.022	3.353	***	Accepted
H6	INI → HIA	0.032	0.018	1.802	0.072	Rejected
H7	NAR → HIA	0.060	0.020	2.951	0.003	Accepted
H8	HIA → HRB	0.283	0.096	2.966	0.003	Accepted

3.3.3 Model Fit Indices

The model fit indices such as CFI, GFI, TLI, NFI, and IFI all exceed the recommended cutoff of 0.90, indicating a good model fit. Additionally, the RMSEA of 0.018 is well below the 0.08 threshold, further supporting the model's adequacy (as shown in Table 7).

4 Discussion

The present study was conducted to identify the determinants of health information avoidance and its subsequent impact on risk behaviors among university students. The descriptive statistics indicate that respondents generally agreed with the statements measuring risk perception, informational norms, information overload, information insufficiency, negative affective risk responses, health information avoidance, and health risk behaviors. Mean scores for these constructs ranged from approximately 3.9 to 4.1, with standard deviations generally below 0.75, indicating a high level of agreement. For example, respondents strongly agreed that health information overload can be detrimental to their health and well-being and that they often struggle to find relevant and trustworthy health information due to information overload. Similarly, there was a high level of agreement regarding the negative affective risk responses and their influence on health-related behaviors.

Building upon previous research studies (Narimani et al. 2023; Wang et al. 2023; Zhang et al. 2022b; Link 2021; Kahlor 2010; Griffin et al. 2013), a conceptual framework was developed (Figure 1). Eight hypotheses were formulated to examine the determinants of health information avoidance and its impact on risk behaviors. These hypotheses were tested using SEM. Four of the eight hypotheses were supported by the analysis.

Supported hypotheses:

- H1: RIS has a positive influence on HIA ($p < 0.05$).
- H5: IFO has a positive influence on HIA ($p < 0.05$).
- H7: NAR has a positive influence on HIA ($p < 0.05$).
- H8: HIA has a positive influence on HRB ($p < 0.05$).

Rejected Hypotheses:

- H2: RIS has no significant influence on NAR ($p = 0.165$).

Table 7: Model fit indices.

Model fit indices	χ^2	DF	IFI	TLI	CFI	GFI	NFI	RMSEA
Acceptable fit[a]	$\chi^2 \leq 3$	DF	IFI ≥ 0.90	TLI ≥ 0.90	CFI ≥ 0.90	GFI ≥ 0.90	NFI ≥ 0.90	RMSEA ≤ 0.08
Model fit values	1.490	552	0.977	0.975	0.976	0.970	0.932	0.018

[a]Cutoff values for fit indices in structural equation modeling (SEM) (Hu and Bentler 1999).

- H3: IFN has no significant influence on HIA (p = 0.324).
- H4: IFO has no significant influence on INI (p = 0.604).
- H6: INI has no significant influence on HIA (p = 0.069).

Our findings align with previous studies (Soroya et al. 2021; Song et al. 2021) demonstrating that risk perception and information overload significantly influence health information avoidance. These findings indicate individuals' perception of health risks plays a key role in determining whether they actively seek or avoid health-related information. Moreover, when overwhelmed by excessive health information, individuals are more likely to avoid it altogether. Furthermore, our findings are consistent with previous studies showing that negative affective risk responses significantly influenced health information avoidance (Link 2021). This suggests that individuals' health information-seeking behavior can be affected by both cognitive and emotional factors. Our findings support prior studies demonstrating that health information avoidance is associated with increased health risks.

Conversely, our findings diverge from previous research (Link 2021) that found a positive relationship between risk perception and negative affective risk response, as our study found a positive but non-significant relationship. These findings indicate that health threat cues perceived by individuals while seeking health information do not directly influence an individual's decision to seek or ignore healthcare information. Our findings align with previous studies (Link 2021; Li 2023) suggesting that information overload has a positive but non-significant influence on information insufficiency, which further non-significantly impacts health information avoidance. These findings suggest that individuals may be motivated to seek health information and become health literate, potentially improving overall health. Furthermore, we found a non-significant negative influence of informational norms on health information avoidance behavior, which aligns with reported studies in the literature (Link 2021; Li 2023; Kuang and Wilson 2017). This suggests that the influence of social norms on avoiding health information is minimal. The study suggests that involving others – such as family, friends, or healthcare professionals – can help reduce avoidance behaviors, ultimately leading to improved health outcomes.

4.1 Implications of the Study

The study contributes to the advancement of the Risk Information Seeking and Processing (RISP) framework by introducing health risk behavior as a new outcome variable. The findings show the detrimental impact of avoidance behavior on university students' health. These findings can inform the development of targeted health awareness campaigns that reduce avoidance behaviors and promote proactive healthcare engagement, ultimately improving health outcomes.

Our research is valuable for medical professionals, health departments, organizations, policymakers, university librarians, and students in understanding the determinants of health information avoidance and its subsequent effects on health risk behaviors. Previous studies (Foust and Taber 2023; Huang et al. 2016) have established a link between consumer health awareness and preventive healthcare behaviors. Our study reinforces this connection, emphasizing the importance of addressing information avoidance behavior to achieve better health outcomes.

The findings of the study have strong implications for university libraries. For example, our key findings indicate that information overload, risk perception, and negative affective risk responses are the main predictors of health information avoidance behaviors. Libraries can play a key role in promoting health literacy skills among students so they can make informed health decisions, and already have a long history of providing information literacy services. These findings suggest that university libraries should prioritize information literacy training, focusing on health information access, evaluation, and application skills. Libraries should also focus on providing information-tailoring services in which university librarians should work to help students find information relevant to their situation so they are not overwhelmed by information that is not. These information literacy programs should dispel myths and misconceptions about health information, emphasize the benefits of seeking accurate and up-to-date information, and equip students with information literacy skills. University libraries should curate high-quality health information resources to help students navigate the health information disorder. In order to reduce negative affective

responses, libraries should promote positive coping strategies to help students manage their emotions when confronted with an explosion of health information. University libraries should collaborate with healthcare organizations to develop joint health education initiatives. These health education/literacy programs could serve as a powerful buffer against the factors that drive health information avoidance. Students with strong health literacy skills can evaluate the authenticity and relevance of health information and filter out low-quality content or irrelevant information. This enables them to seek relevant information from the flood of information resources without feeling overwhelmed. Moreover, strong health literacy skills can enable students to understand and interpret complex health concepts, research findings, and health statistics. This allows them to make informed decisions about their health risks, which also helps them in reducing their anxiety about potential health risks.

4.2 Novelty and Originality

This study offers a novel perspective by applying the RISP model to examine health information avoidance among university students and its association with health risk behaviors. By incorporating health risk behavior as an outcome variable, the study expands the theoretical utility of the RISP model and contributes to a broader understanding of information-seeking behavior. The findings contribute to the existing body of knowledge by identifying key factors within the RISP model that significantly influence health information avoidance. These findings can inform the development of targeted interventions to reduce health information avoidance and promote health-seeking behaviors.

4.3 Limitations of the Study

The present study has a few limitations. First, the cross-sectional survey design has its limitations in terms of self-reported data, which can be subjective and always subject to respondents' understanding of the question statements – this may limit our ability to establish causal relationships. However, we suggest longitudinal or experimental research designs would be more appropriate for exploring information behavior patterns in detail. Second, notably, some survey items, particularly within the health information avoidance (HIA) sub-scale, such as HIA1, HIA2, and HIA5, contained double-barreled items and may have introduced confounding variables, potentially inflating correlations between health information avoidance, information overload, and health literacy. For example, item HIA1 asked participants about avoiding health information due to information overload, while H1A2 and HIA5 linked avoidance to perceived health literacy. Thus, this design makes it difficult to isolate the independent effects of health information avoidance, information overload, and health literacy, which poses a significant threat to the validity of our findings. Therefore, we recommend that findings should be interpreted with caution due to limitations in the survey instrument. Future studies should use revised survey items that measure each construct separately, such as information overload, health literacy, and health information avoidance, which will enhance the accuracy and reliability of results. Third, we recognize that the four-point scale used (extremely bad, relatively bad, normal, extremely good) to measure the health status of the respondents in the demographic section is unbalanced and potentially confusing. Therefore, we recommend that health status findings be interpreted with caution due to measurement scale limitations. Fourth, the use of a university student sample might restrict the generalizability of our findings to the broader population. Finally, generalizing these findings to different populations, settings, and contexts requires considering factors such as health literacy, healthcare information access, and information infrastructure.

Another potential limitation of the study could be the low factor loadings for certain items within the Health Information Avoidance (HIA) construct. Specifically, certain items exhibited factor loadings between 0.50 and 0.55, which fall below the conventionally accepted threshold of 0.70. There could be several reasons for this, including the complexity of the construct, the lack of variability in responses, and the presence of double-barreled questions in the HIA construct. Due to its multifaceted and complex nature, measuring the construct HIA with high precision can be challenging; moreover, only a small percentage were in the strongly disagree and disagree categories. Overall, there is a lack of variability in responses, as 90 % of responses were either agree or strongly agree, while fewer responses were in the strongly disagree and disagree categories. The presence of double-barreled questions in the HIA construct may also affect factor loading. All of this can contribute to weakening the item-construction relationship.

Despite these limitations, this study provides valuable insights into the factors associated with health information avoidance. However, the findings should be interpreted in light of the measurement issues discussed.

5 Conclusion

This study assessed health information avoidance behavior and its consequence on health risk behaviors using the

measurement model based on the Risk Information Seeking and Processing (RISP) model. The study concludes that risk perception, information overload, and negative affective risk responses significantly influence health information avoidance, which in turn significantly impacts health risk behavior. Conversely, information insufficiency and informational norms do not significantly influence health information avoidance. These findings highlight the importance of health literacy programs for effectively reducing risk perception, information overload, and negative affective risk perception, and promoting efficient health information seeking.

Acknowledgments: Princess Nourah Bint Abdulrahman University Researchers Supporting Project number (PNURSP2025R260), Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia.

Informed consent: Informed consent was obtained from all questionnaire respondents.

Conflict of interest: The authors have no conflicts of interest to disclose.

Research funding: This paper was supported by Guangdong Provincial Library Research Project: Establishment of Performance Evaluation System for Information Services in University Libraries – Taking Intellectual Property Information Services as an Example (GDTK23030). No personally identifiable information was collected from questionnaire respondents. Participation consents were obtained in verbal or written from each individual participant in the study.

Data availability statement: The core data supporting the findings of this study are available within the article; further details can be obtained from the authors upon reasonable request.

References

Addison, C. V. 2017. "The Issue of Avoidance: Information Avoidance in the Context of Personal Health Concerns." Doctoral dissertation (Philosopy), The Faculty of Graduate and Postdoctoral Studies, University of British Columbia.

Ahn, J., and L. A. Kahlor. 2023. "When Experts Offer Conflicting Information: A Study of Perceived Ambiguity, Information Insufficiency, Trustworthiness and Risk Information Behaviors." *Health Communication* 38 (14): 3276–86. https://doi.org/10.1080/10410236.2022.2146033.

Ajzen, I. 2011. "The Theory of Planned Behaviour: Reactions and Reflections." *Psychology & Health* 26 (9): 1113–27. https://doi.org/10.1080/08870446.2011.613995.

Benishek, L. E., L. J. Radonovich, B. H. Blackley, and D. N. Weissman. 2023. "Healthcare Workers' Infection Risk Perceptions of Aerosol-Generating Procedures and Affective Response." *Antimicrobial Stewardship & Healthcare Epidemiology* 3 (1): e29. https://doi.org/10.1017/ash.2022.276.

Berkman, N. D., S. L. Sheridan, K. E. Donahue, D. J. Halpern, and K. Crotty. 2011. "Low Health Literacy and Health Outcomes: An Updated Systematic Review." *Annals of Internal Medicine* 155 (2): 97–107. https://doi.org/10.7326/0003-4819-155-2-201107190-00005.

Bujang, M. A., E. D. Omar, and N. A. Baharum. 2018. "A Review on Sample Size Determination for Cronbach's Alpha Test: A Simple Guide for Researchers." *The Malaysian Journal of Medical Sciences: MJMS* 25 (6): 85. https://doi.org/10.21315/mjms2018.25.6.9.

Chen, X., M. Li, and G. L. Kreps. 2022. "Double Burden of COVID-19 Knowledge Deficit: Low Health Literacy and High Information Avoidance." *BMC Research Notes* 15 (1): 1–7. https://doi.org/10.1186/s13104-022-05913-8.

Conway, K. P., K. Bhardwaj, E. Michel, D. Paksarian, A. Nikolaidis, M. Kang, et al. 2022. "Association Between COVID-19 Risk-Mitigation Behaviors and Specific Mental Disorders in Youth." *Research Square* 17 (1): 4–17. https://doi.org/10.21203/rs.3.rs-2026969/v1.

De Pasquale, C., M. L. Pistorio, F. Sciacca, and Z. Hichy. 2021. "Relationships Between Anxiety, Perceived Vulnerability to Disease, and Smartphone Use During Coronavirus Disease 2019 Pandemic in a Sample of Italian College Students." *Frontiers in Psychology* 12: 1–7. https://doi.org/10.3389/fpsyg.2021.692503.

Deline, M. B., and L. A. Kahlor. 2019. "Planned Risk Information Avoidance: A Proposed Theoretical Model." *Communication Theory* 29 (3): 360–82. https://doi.org/10.1093/ct/qty035.

Ek, S., and J. Heinström. 2011. "Monitoring or Avoiding Health Information: The Relation to Inner Inclination and Health Status." *Health Information and Libraries Journal* 28 (3): 200–9. https://doi.org/10.1111/j.1471-1842.2011.00947.x.

Ellis, D. 1989. "A Behavioural Approach to Information Retrieval System Design." *Journal of Documentation* 45 (3): 171–212. https://doi.org/10.1108/eb026843.

Ford, J. L., M. Douglas, and A. K. Barrett. 2023. "The Role of Pandemic Fatigue in Seeking and Avoiding Information on COVID-19 Among Young Adults." *Health Communication* 38 (11): 2336–49. https://doi.org/10.1080/10410236.2022.2069211.

Foust, J. L., and J. M. Taber. 2023. "Information Avoidance: Past Perspectives and Future Directions." *Perspectives on Psychological Science* 20 (2): 241–63. https://doi.org/10.1177/17456916231197668.

Gigerenzer, G., and W. Gaissmaier. 2011. "Heuristic Decision Making." *Annual Review of Psychology* 62 (1): 451–82. https://doi.org/10.1146/annurev-psych-120709-145346.

Griffin, R. J., S. Dunwoody, and Z. J. Yang. 2013. "Linking Risk Messages to Information Seeking and Processing." *Annals of the International Communication Association* 36 (1): 323–62. https://doi.org/10.1080/23808985.2013.11679138.

He, R., and Y. Li. 2021. "Media Exposure, Cancer Beliefs, and Cancer-Related Information-Seeking or Avoidance Behavior Patterns in China." *International Journal of Environmental Research and Public Health* 18 (6): 3130. https://doi.org/10.3390/ijerph18063130.

Howell, J. L., N. P. Lipsey, and J. A. Shepperd. 2020. "Health Information Avoidance." In *The Wiley Encyclopedia of Health Psychology*, edited by M. L. Robbins, K. Sweeny, and L. M. Cohen. New Jersey: John Wiley & Sons Ltd.

Hu, L., and P. M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* 6 (1): 1–55. https://doi.org/10.1080/10705519909540118.

Huang, F.-F., Y.-H. Lai, C.-H. Lin, and H.-H. Yang 2016. "Health Knowledge Insufficiency Motivates Health Information Seeking." *International Journal Web Applications* 8 (1): 1–7. https://www.dline.info/ijwa/fulltext/v8n1/ijwav8n1_1.pdf (accessed May 20, 2025).

Hwang, Y., and S.-H. Jeong. 2016. "Information Insufficiency and Information Seeking: An Experiment." *Science Communication* 38 (6): 679–98. https://doi.org/10.1177/1075547016673200.

Hwang, Y., and S.-H. Jeong. 2020. "A Channel-Specific Analysis of the Risk Information Seeking and Processing (RISP) Model: The Role of Relevant Channel Beliefs and Perceived Information Gathering Capacity." *Science Communication* 42 (3): 279–312. https://doi.org/10.1177/1075547020926612.

Ittefaq, M., H. Seo, M. Abwao, and A. Baines. 2022. "Social Media Use for Health, Cultural Characteristics, and Demographics: A Survey of Pakistani Millennials." *Digit Health* 8: 1–12. https://doi.org/10.1177/20552076221089454.

Jensen, J. D., M. Pokharel, N. Carcioppolo, S. Upshaw, K. K. John, and R. A. Katz. 2020. "Cancer Information Overload: Discriminant Validity and Relationship to Sun Safe Behaviors." *Patient Education and Counseling* 103 (2): 309–14. https://doi.org/10.1016/j.pec.2019.08.039.

Kahlor, L. A. 2010. "PRISM: A Planned Risk Information Seeking Model." *Health Communication* 25 (4): 345–56. https://doi.org/10.1080/10410231003775172.

Kim, Y., and S. Chung. 2023. "Risk-Likelihood Perceptions and Preventive Behaviors Against Infectious Diseases: Testing Different Types of Risk-Likelihood Perceptions in the Context of MERS and COVID-19." *Health Communication* 38 (10): 2221–34. https://doi.org/10.1080/10410236.2022.2059831.

Kim, S., and J. Hwang. 2022. "Examining Risk Factors for Mental Health During the COVID-19 Pandemic-Focusing on Older Adults in South Korea." *International Journal of Public Health* 67: 1–8. https://doi.org/10.3389/ijph.2022.1604487.

Kim, H. K., J. Ahn, L. Atkinson, and L. A. Kahlor. 2020. "Effects of COVID-19 Misinformation on Information Seeking, Avoidance, and Processing: A Multicountry Comparative Study." *Science Communication* 42 (5): 586–615. https://doi.org/10.1177/1075547020959670.

Kuang, K., and S. R. Wilson. 2017. "A Meta-analysis of Uncertainty and Information Management in Illness Contexts." *Journal of Communication* 67 (3): 378–401. https://doi.org/10.1111/jcom.12299.

Kuhlthau, C. C. 1993. "A Principle of Uncertainty for Information Seeking." *Journal of Documentation* 49 (4): 339–55. https://doi.org/10.1108/eb026918.

Li, J. 2023. "Information Avoidance in the Age of COVID-19: A Meta-analysis." *Information Processing & Management* 60 (1): 103163. https://doi.org/10.1016/j.ipm.2022.103163.

Link, E. 2021. "Information Avoidance During Health Crises: Predictors of Avoiding Information About the COVID-19 Pandemic Among German News Consumers." *Information Processing & Management* 58 (6): 102714. https://doi.org/10.1016/j.ipm.2021.102714.

Liu, Z., and J. Yang. 2023. "Public Support for COVID-19 Responses: Cultural Cognition, Risk Perception, and Emotions." *Health Communication* 38 (4): 648–58. https://doi.org/10.1080/10410236.2021.1965710.

Liu, M., Y. Chen, D. Shi, and T. Yan. 2021. "The Public's Risk Information Seeking and Avoidance in China During Early Stages of the COVID-19 Outbreak." *Frontiers in Psychology* 12: 649180. https://doi.org/10.3389/fpsyg.2021.649180.

McQueen, A., S. W. Vernon, and P. R. Swank. 2013. "Construct Definition and Scale Development for Defensive Information Processing: An Application to Colorectal Cancer Screening." *Health Psychology* 32 (2): 190. https://doi.org/10.1037/a0027311.

Meng, G., Q. Li, X. Yuan, Y. Zheng, K. Hu, B. Dai, et al. 2023. "The Roles of Risk Perception, Negative Emotions and Perceived Efficacy in the Association Between COVID-19 Infection Cues and Preventive Behaviors: A Moderated Mediation Model." *BMC Public Health* 23 (1): 109. https://doi.org/10.1186/s12889-022-14870-7.

Metzger, M. J., E. H. Hartsell, and A. J. Flanagin. 2020. "Cognitive Dissonance or Credibility? A Comparison of Two Theoretical Explanations for Selective Exposure to Partisan News." *Communication Research* 47 (1): 3–28. https://doi.org/10.1177/0093650215613136.

Misra, S., and D. Stokols. 2012. "Psychological and Health Outcomes of Perceived Information Overload." *Environment and Behavior* 44 (6): 737–59. https://doi.org/10.1177/0013916511404408.

Na, P. J., D. V. Jeste, and R. H. Pietrzak. 2023. "Social Disconnection as a Global Behavioral Epidemic – A Call to Action About a Major Health Risk Factor." *JAMA Psychiatry* 80 (2): 101–2. https://doi.org/10.1001/jamapsychiatry.2022.4162.

Naderbeigi, F., A. Isfandyari-Moghaddam, A. Zarei, and B. Bayat. 2020. "Information Avoidance in the Mirror of Literature: A Systematic Review." *Human Information Interaction* 6 (4): 1–12.

Narayan, B., D. O. Case, and S. L. Edwards. 2011. "The Role of Information Avoidance in Everyday-Life Information Behaviors." *Proceedings of the American Society for Information Science and Technology* 48 (1): 1–9. https://doi.org/10.1002/meet.2011.14504801085.

Narimani, S., N. Mozaffari, A. Habibi Soola, R. Nasiri, T. Omidi, N. Sedri, et al. 2023. "Risk Communication and Risk Perception Along with its Influencing Factors in Covid-19 Disease: Focusing on the Extended Parallel Process Model." *International Journal of Disaster Risk Reduction* 86: 1–8. https://doi.org/10.1016/j.ijdrr.2023.103547.

Orom, H., E. Schofield, M. T. Kiviniemi, E. A. Waters, C. Biddle, X. Chen, et al. 2018. "Low Health Literacy and Health Information Avoidance But Not Satisficing Help Explain "Don'tTKnow" Responses to Questions Assessing Perceived Risk." *Medical Decision Making* 38 (8): 1006–17. https://doi.org/10.1177/0272989X18799999.

Park, T., I. Ju, J. E. Ohs, A. Hinsley, and Jagannath Muzumdar. 2023. "Information Seeking During the COVID-19 Pandemic: Application of the Risk Information Seeking and Processing Model." *Research in Social and Administrative Pharmacy* 19 (6): 956–64. https://doi.org/10.1016/j.sapharm.2023.03.010.

Popovic, N. F., U. U. Bentele, J. C. Pruessner, M. Moussaïd, and W. Gaissmaier. 2020. "Acute Stress Reduces the Social Amplification of Risk Perception." *Scientific Reports* 10 (1): 7845. https://doi.org/10.1038/s41598-020-62399-9.

Qu, Y., A. J. Saffer, and L. Austin. 2023. "What Drives People Away from COVID-19 Information? Uncovering the Influences of Personal Networks on Information Avoidance." *Health Communication* 38 (2): 216–27. https://doi.org/10.1080/10410236.2021.1944457.

Rubin, G. J., R. Webster, R. Amlot, H. Carter, D. Weston, and S. Wessely. 2020. "Public Responses to the Salisbury Novichok Incident: A Cross-Sectional Survey of Anxiety, Anger, Uncertainty, Perceived Risk and Avoidance Behaviour in the Local Community." *BMJ Open* 10 (9): e036071. https://doi.org/10.1136/bmjopen-2019-036071.

Sairanen, A., and R. Savolainen. 2010. "Avoiding Health Information in the Context of Uncertainty Management." *Information Research* 15 (4): 1–14. https://informationr.net/ir/15-4/paper443.html (accessed May 20, 2025).

Samadipour, E., F. Ghardashi, and N. Aghaei. 2023. "Evaluation of Risk Perception of COVID-19 Disease: A Community-Based Participatory

Study." *Disaster Medicine and Public Health Preparedness* 17: e10. https://doi.org/10.1017/dmp.2020.311.

Shahzad, M. S., S. A. Akram, and S. B. H. Hashmi. 2016. "Azad Jammu and Kashmir and Gilgit Baltistan: Historical, Constitutional & Administrative Development." *Journal of Contemporary Studies* 5 (1): 69–85. https://doi.org/10.54690/jcs.v5i1.67.

Snedden, C. 2023. "Locating Azad Kashmir." In *The Palgrave Handbook of New Directions in Kashmir Studies*, edited by H. Duschinski, M. Bhan, and C. D. Robinson, 43–58. London: Springer.

Soares, P., A. Leite, S. Esteves, A. Gama, P. A. Laires, M. Moniz, et al. 2021. "Factors Associated with the Patient's Decision to Avoid Healthcare During the COVID-19 Pandemic." *International Journal of Environmental Research and Public Health* 18 (24): 13239. https://doi.org/10.3390/ijerph182413239.

Song, S., X. Yao, and N. Wen. 2021. "What Motivates Chinese Consumers to Avoid Information About the COVID-19 Pandemic? The Perspective of the Stimulus-Organism-Response Model." *Information Processing & Management* 58 (1): 102407. https://doi.org/10.1016/j.ipm.2020.102407.

Soroya, S. H., and A. Faiola. 2023. "Why Did People Avoid Information During the COVID-19 Pandemic? Understanding Information Sources' Dynamics Among Pakistani Z Generation." *Library Hi Tech* 41 (1): 229–47. https://doi.org/10.1108/LHT-02-2022-0113.

Soroya, S. H., A. Farooq, K. Mahmood, J. Isoaho, and S. Zara. 2021. "From Information Seeking to Information Avoidance: Understanding the Health Information Behavior During a Global Health Crisis." *Information Processing & Management* 58 (2): 1–16. https://doi.org/10.1016/j.ipm.2020.102440.

Spleen, A. M., E. J. Lengerich, F. T. Camacho, and R. C. Vanderpool. 2014. "Health Care Avoidance Among Rural Populations: Results from a Nationally Representative Survey." *The Journal of Rural Health* 30 (1): 79–88. https://doi.org/10.1111/jrh.12032.

Splinter, M. J., P. Velek, M. K. Ikram, B. C. T. Kieboom, R. P. Peeters, P. J. E. Bindels, et al. 2021. "Prevalence and Determinants of Healthcare Avoidance During the COVID-19 Pandemic: A Population-Based Cross-Sectional Study." *PLoS Medicine* 18 (11): e1003854. https://doi.org/10.1371/journal.pmed.1003854.

St Jean, B., G. Jindal, and Y. Liao. 2017. "Is Ignorance Really Bliss? Exploring the Interrelationships Among Information Avoidance, Health Literacy and Health Justice." *Proceedings of the Association for Information Science and Technology* 54 (1): 394–404. https://doi.org/10.1002/pra2.2017.14505401043.

Subagyo, F. A. K. D., and I. Irwansyah. 2021. "Cognitive Dissonance in Health-Seeking Behavior of People in Indonesia to Prevent COVID-19." *SALAM: Jurnal Sosial dan Budaya Syar-i* 8 (1): 251–66. https://doi.org/10.15408/sjsbs.v8i1.18692.

Toapanta, N., K. Salas-Gama, P. E. Pantoja, and M. J. Soler. 2023. "The Role of Low Health Literacy in Shared Treatment Decision-making in Patients with Kidney Failure." *Clinical Kidney Journal* 16 (Supplement_1): i4–i11. https://doi.org/10.1093/ckj/sfad061.

Tretter, F., and H. Löffler-Stastka. 2024. "Cognitive Dissonance and Mindset Perturbations During Crisis: "Eco-Socio-Psycho-Somatic" Perspectives." *World Journal of Psychiatry* 14 (2): 215. https://doi.org/10.5498/wjp.v14.i2.215.

Vrinten, C., D. Boniface, S. H. Lo, L. C. Kobayashi, C. von Wagner, and J. Waller. 2018. "Does Psychosocial Stress Exacerbate Avoidant Responses to Cancer Information in Those Who are Afraid of Cancer? A Population-Based Survey Among Older Adults in England." *Psychology & Health* 33 (1): 117–29. https://doi.org/10.1080/08870446.2017.1314475.

Vu, L., I. Soraperra, M. Leib, J. van der Weele, and S. Shalvi. 2023. "Ignorance by Choice: A Meta-analytic Review of the Underlying Motives of Willful Ignorance and its Consequences." *Psychological Bulletin* 149 (9–10): 611. https://doi.org/10.1037/bul0000398.

Wang, W., L. Atkinson, L. A. Kahlor, P. Jamar, and H. S. Lim. 2023. "Avoiding COVID-19 Risk Information in the United States: The Role of Attitudes, Norms, Affect, Social Dominance Orientations, and Perceived Trustworthiness of Scientists." *Risk Analysis* 43 (6): 1145–61. https://doi.org/10.1111/risa.13991.

West, S. G., J. F. Finch, and P. J. Curran. 1995. "Structural Equation Models with Nonnormal Variables: Problems and Remedies." In *Structural Equation Modeling: Concepts, Issues, and Applications*, edited by R. H. Hoyle, 56–75. Thousand Oaks: Sage Publications, Inc.

Wilson, T. D. 1999. "Models in Information Behaviour Research." *Journal of Documentation* 55 (3): 249–70. https://doi.org/10.1108/EUM0000000007145.

Yang, Y., W. Wei, and T. Wang. 2023. "The Relationship Between Perceived Vulnerability to Disease and Anxiety During the COVID-19 Pandemic: Serial Mediation by Fear of COVID-19 and Trust in the Government." *Psychology Research and Behavior Management* 16: 989–96. https://doi.org/10.2147/prbm.S398555.

Yildirim, M., M. E. Turan, N. S. Albeladi, P. Crescenzo, A. Rizzo, G. Nucera, et al. 2023. "Resilience and Perceived Social Support as Predictors of Emotional Well-Being." *Journal of Health and Social Sciences* 8 (1): 59–75. https://doi.org/10.19204/2023/rsln5.

Zhang, Y., S. Tao, Y. Qu, X. Mou, H. Gan, P. Zhou, et al. 2022a. "The Correlation Between Lifestyle Health Behaviors, Coping Style, and Mental Health During the COVID-19 Pandemic Among College Students: Two Rounds of a Web-Based Study." *Frontiers in Public Health* 10: 1031560. https://doi.org/10.3389/fpubh.2022.1031560.

Zhang, K., N. Zhang, J. Wang, J. Jiang, and S. Xu. 2022b. "Exploring the Roles of Fear and Powerlessness in the Relationship Between Perceived Risk of the COVID-19 Pandemic and Information-Avoidance Behavior." *Frontiers in Psychology* 13: 1–9. https://doi.org/10.3389/fpsyg.2022.1005142.

Zhao, S., and Y. Liu. 2021. "The More Insufficient, the More Avoidance? Cognitive and Affective Factors that Relates to Information Behaviours in Acute Risks." *Frontiers in Psychology* 12: 730068. https://doi.org/10.3389/fpsyg.2021.730068.

Zhou, T., and Y. Xie. 2024. "Understanding Social Media Users' Information Avoidance Intention: A CAC Perspective." *Aslib Journal of Information Management* 76 (4): 570–84. https://doi.org/10.1108/AJIM-10-2022-0471.

Zhou, X., A. J. Roberto, and A. H. Lu. 2023. "Understanding Online Health Risk Information Seeking and Avoiding During the COVID-19 Pandemic." *Health Communication* 38 (3): 532–42. https://doi.org/10.1080/10410236.2021.1958981.

Zimmerman, M. S., and G. Shaw Jr. 2020. "Health Information Seeking Behaviour: A Concept Analysis." *Health Information and Libraries Journal* 37 (3): 173–91. https://doi.org/10.1111/hir.12287.

（3）Global Cassava Germplasm Resources: Industrial and Technological Development (A 类)

Food and Energy Security

WILEY

Food and Energy Security Open Access

REVIEW OPEN ACCESS

Global Cassava Germplasm Resources: Industrial and Technological Development

Jiaxi Li[1] | Yang Liu[2,3] | Yanwen Tan[1] | Liangshan Yang[4]

[1]College of Economics and Management, South China Agricultural University, Guangzhou, Guangdong, China | [2]Library, South China Agricultural University, Guangzhou, Guangdong, China | [3]School of Data Science, City University of Macau, Macau, China | [4]Institute of Agricultural Natural Resources and Regional Planning, Zhejiang Academy of Agricultural Sciences, Zhejiang, China

Correspondence: Yanwen Tan (tanyw@scau.edu.cn) | Liangshan Yang (66379852@qq.com)

Received: 27 February 2025 | **Revised:** 28 August 2025 | **Accepted:** 1 September 2025

Funding: This work was supported by China Agriculture Research System—Cassava (CARS-11-GDTYW). National Natural Science Foundation of China (71961147002), National Social Science Foundation of China (23&ZD121).

Keywords: cassava germplasm resource | cassava industry | molecular breeding | traditional breeding

ABSTRACT

The main cassava-producing regions include Africa, South America, Southeast Asia, and China. Due to significant differences in natural environments, industrial backgrounds, and technological resources for germplasm development across these regions, the utilization of cassava germplasm resources shows regional variation. Currently, global approaches to cassava germplasm development and utilization include traditional breeding methods such as selective breeding, mutation breeding, and hybrid breeding, as well as modern techniques like marker-assisted selection, genome editing, and genetic modification. Regionally, Africa mainly focuses on developing germplasm resources that improve resistance to environmental stress, enhance nutritional content, and strengthen pest and disease resistance. South America primarily emphasizes cultivating edible cassava germplasm. Southeast Asia prioritizes screening high-quality germplasm and developing high-yield, high-starch, and disease-resistant varieties. China concentrates on germplasm development aligned with food security strategies and high-quality edible cassava varieties. In the future, modern breeding technologies will be vital in advancing cassava germplasm development and use. Disease and pest resistance traits will become essential qualities for high-quality cassava germplasm. Additionally, different major cassava-producing regions should tailor their germplasm development strategies to their specific industrial needs and regional characteristics.

1 | Introduction

Cassava, along with potatoes and sweet potatoes, is recognized as one of the "world's three major tuber crops." It originates from South America and was introduced to Africa in the 16th century, gradually spreading to over 100 countries in the world (Zhang 2011; Xie et al. 2017). Today, it is widely cultivated in tropical and some subtropical regions, known for its drought tolerance and ability to thrive in barren soils, making it highly adaptable to various environments. The main production regions include Africa, Asia, and South America (Cock and Connor 2021). The starch content of cassava exceeds 85% of its dry matter, which is higher than that of other staple crops such as rice and maize. It serves as a staple food for nearly 1 billion people and is also a key raw material for industrial products such as ethanol, starch, and animal feed (Cock 1982). However, in the main cassava-producing areas, the absence of high-quality varieties with traits such as disease and pest resistance, high starch content, and suitability for mechanization remains a significant limitation. The gap between potential and actual cassava yields could be up to six times (Adebayo 2023; Malik et al. 2020; Ou et al. 2016; Deng

Yang Liu is the co-first author of this paper.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2025 The Author(s). *Food and Energy Security* published by John Wiley & Sons Ltd.

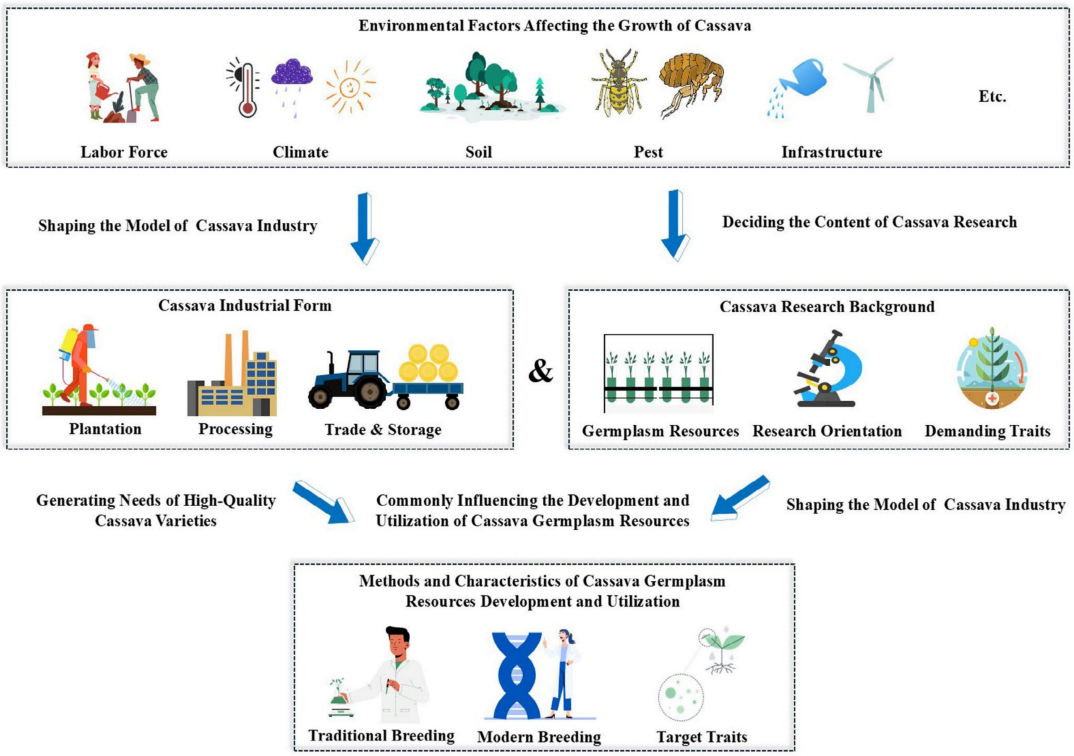


FIGURE 1 | The Influence pathways of the growth environment of cassava on the development and utilization of cassava germplasm resources.

et al. 2019). Therefore, developing and applying high-quality cassava varieties could help improve food security, promote inclusive growth, and stabilize the supply chain for industrial raw materials in developing countries within the main cassava-producing regions.

Germplasm resources are the genetic material inherited from parent organisms by their offspring. The development of germplasm resources is one of the most important innovations in agricultural science and technology (Xu et al. 2018), and it plays a key role in breeding crops with high-quality traits (Jing et al. 2021). For cassava, developing and utilizing germplasm resources is vital for increasing yield, increasing starch content, improving nutritional quality, optimizing mechanization suitability, and developing disease resistance (Luiz and Chen 2020; Ceballos et al. 2012). Currently, cassava germplasm development worldwide involves traditional germplasm selection, mutation breeding, hybrid breeding, and molecular breeding (Chen et al. 2024). Overall, the direction and methods of cassava breeding depend on the structure of the cassava industry, available breeding technologies, and the germplasm resources accessible in different regions.

Furthermore, the form of industry and agricultural technology is closely related to the local cassava production environment (Figure 1). However, existing literature mainly reviews the global development of cassava germplasm resources from a technological perspective, with limited attention to industrial development (Xiao et al. 2025; Kongsil et al. 2024; Mbanjo et al. 2021). Therefore, we reviewed the literature to analyze the worldwide development and utilization of cassava germplasm resources from both industrial and technological perspectives to bridge this gap. In addition, we offer recommendations for major cassava-producing regions to develop cassava germplasm resources.

2 | The Development and Challenges of the Cassava Industry in Major Cassava-Producing Regions

2.1 | The Major Cassava Producing Regions in the World

According to cassava production data from the Food and Agriculture Organization (FAO) official database FAOSTAT, the main cassava-producing countries in Africa include Nigeria, the Democratic Republic of Congo, Ghana, Angola, Mozambique, and Côte d'Ivoire. In 2023, these countries made up 75.29% of Africa's total fresh cassava production, mainly in tropical rainforests and tropical savanna climates. In the Americas, Brazil is the leading cassava producer, also located in a tropical rainforest and tropical savanna climate. In 2023, Brazil's fresh cassava production accounted for 72.98% of South America. In Asia, the top cassava-producing countries include Thailand, Indonesia, Cambodia, and Vietnam. All

these Southeast Asia countries produced 77.72% of Asia's total fresh cassava production in 2023 (FAOSTAT), mainly in tropical monsoon climate regions.

Although China's cassava production in 2023 only represented 5.54% of Asia's total cassava production (FAOSTAT) However, since the 1980s, Chinese research institutions, such as the Chinese Academy of Tropical Agricultural Sciences, have collaborated internationally with the Tropical Agriculture Research Center, part of the Consultative Group on International Agricultural Research (CGIAR), on cassava research. As a result, China has not only taken a leading role in global germplasm resource research, but has also established the China National Cassava Germplasm Repository, which collects 80% of the world's cassava germplasm resources (Liang et al. 2024). Furthermore, China has actively promoted cassava technology transfer to the main cassava-producing countries, especially those involved in the Belt and Road Initiative (BRI). In Africa and other BRI countries, more than 666,700 ha of Chinese-developed "South China" cassava varieties have been cultivated (Chen 2024), and several mosaic virus-resistant varieties have been bred locally with China's assistance (Xue et al. 2015). Therefore, China's cassava germplasm resource development model not only provides a valuable example for other regions, but has also significantly contributed to the development of the cassava industry in many areas. As a result, this review will consider China as a main cassava-producing region along with Africa, South America, and Southeast Asia.

2.2 | The Cassava Industry Development in Major Producing Regions

2.2.1 | Fresh Cassava Production in Major Producing Regions

In 2023, the global fresh cassava production reached 334 million tons. Africa produced 213 million tons, accounting for 63.86%; Southeast Asia produced 81.31 million tons (24.37%); South America produced 25.37 million tons (7.60%); and China produced 5.15 million tons, accounting for 1.54%. The total production from the major cassava-producing regions accounted for 97.37% of the global output (FAOSTAT). From 2014 to 2023, the production trends in the major cassava-producing regions were as follows: Africa's cassava production continued to grow steadily, Southeast Asia remained relatively stable, South America showed a decline, and China experienced a slight increase (Figure 2).

From 2014 to 2023, the cassava yield per unit area in major producing regions remained relatively consistent. Southeast Asia had the highest cassava yield, averaging about 21 tons per hectare (t/ha), followed by China, with approximately 16 t/ha. In South America, cassava yield was around 13 t/ha, while Africa had the lowest yield, at roughly 8 t/ha (Figure 3).

2.2.2 | Import and Export Trade of Cassava Products in Major Producing Regions

Fresh cassava roots are fragile, with high water content, and can only be stored at room temperature for 2–3 days after harvest before they begin to lose water, turn brown, or even rot (Uchechukwu-Agua et al. 2015). As a result, cassava is mainly traded in processed products such as dried cassava chips, cassava flour, and starch.

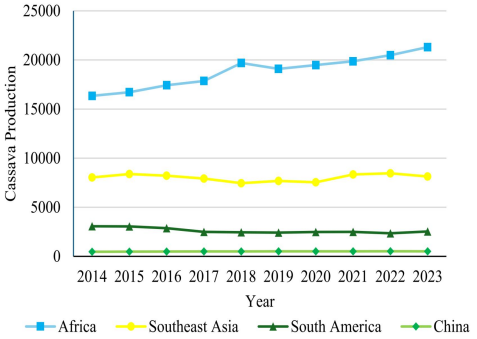


FIGURE 2 | Cassava production in major cassava producing regions (2014–2023) (Unit: 10,000 tons). *Source:* FAOSTAT.

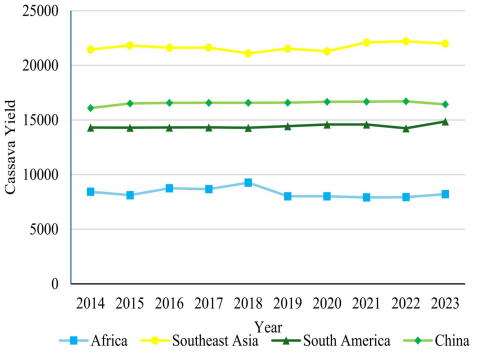


FIGURE 3 | Cassava yield per unit area in major cassava producing regions (2014–2023) (Unit: kg/ha). *Source:* FAOSTAT.

Africa is the world's largest cassava-producing region, but it has relatively low cassava exports for two main reasons. Firstly, cassava is a staple food for local populations and is crucial for food security. For example, in Nigeria, approximately 90% of fresh cassava roots are consumed locally (Montagnac et al. 2009). Secondly, limited storage and processing technologies restrict the cassava processing industry and large-scale exports in Africa (Sakadzo et al. 2025; Feyisa 2021).

Cassava starch is a major processed product of cassava. Based on the import and export trade of cassava starch in key cassava-producing regions, Southeast Asia stands out as the world's leading cassava starch processing hub, with total exports ranging from 4 million to 6 million tons per year. In comparison, Africa and South America have relatively lower trade volumes for cassava starch. China is the largest importer, and its import volume has generally increased (Figure 4). According to data from the Chinese Cassava Agro-technology Research System (CCARS), China's reliance on imported cassava starch grew from 35% in 2012 to 94% in 2023. Meanwhile, China's domestic cassava

starch production dropped from 315,300 tons in 2020 to 187,900 tons in 2023.

Cassava tapioca is an essential ingredient in various beverages and desserts. Its primary component is cassava starch, which provides it with excellent elasticity and chewiness. It is commonly consumed with tea, coconut milk, and regular milk (Zhang, Li, et al. 2022). Generally, the import and export volume of cassava tapioca in Africa and South America is relatively low. China imports approximately 14,000 tons of cassava tapioca and exports around 60,000 tons each year, making it the world's largest importer and exporter of cassava tapioca. In Southeast Asia, annual imports are about 20,000 tons, while exports are approximately 45,000 tons (Figure 5).

2.2.3 | Current Status of the Cassava Industry in Major Producing Regions

Cassava cultivation and trade in major global producing regions display distinct regional characteristics. Data from FAOSTAT indicates that Africa leads the world in cassava production globally. However, its yield per unit area is the lowest among major cassava-producing regions, about one-third of Southeast Asia's and half of China's. Additionally, cassava in Africa is primarily for food, with relatively little processing (Feyisa 2021).

In contrast, Southeast Asia ranks second in total cassava production but has the highest yield per unit area worldwide. This region also features a highly developed international trade in cassava products, indicating a well-established cassava starch industry (Rangsarannon 2018). Notably, Southeast Asia is the only major cassava-producing region globally that exports large volumes of fresh cassava (FAOSTAT), mainly targeting high-end markets in developed countries (Weerasak 2021).

South America has relatively low total cassava production, with yields below those in Southeast Asia and China but higher than in Africa. The international trade in cassava and its products is relatively limited, mainly serving domestic demand. A key aspect of cassava cultivation in South America is the presence of Amarelinha do Amapá, an important edible cassava germplasm resource in Brazil's Amapá state. This variety is rich in β-carotene and provides an important source of vitamin A for the local population (Parmar et al. 2017).

China has the lowest total cassava production among the major producing regions. However, its yield per unit area is second only to Southeast Asia. Most of China's cassava-growing areas are located in subtropical climates, which have certain disadvantages compared to the tropical climates of other major cassava-producing regions. Factors such as low temperatures, rainfall variations, and limited sunlight could shorten the

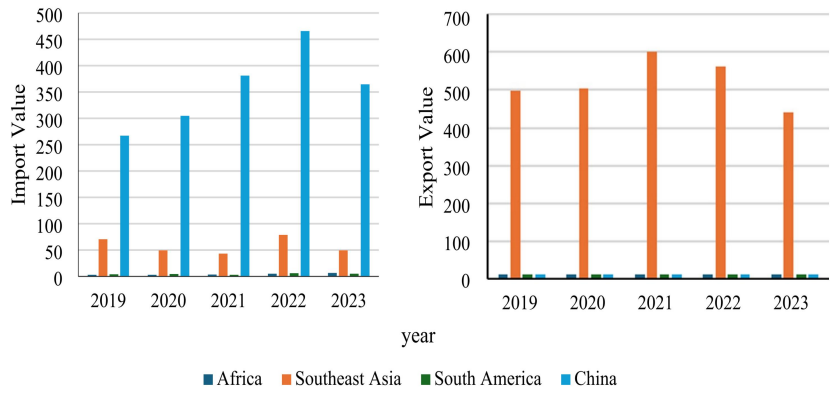


FIGURE 4 | Import and export of cassava starch in major cassava producing regions (2019–2023) (Unit: 10,000 t). *Source:* FAOSTAT.

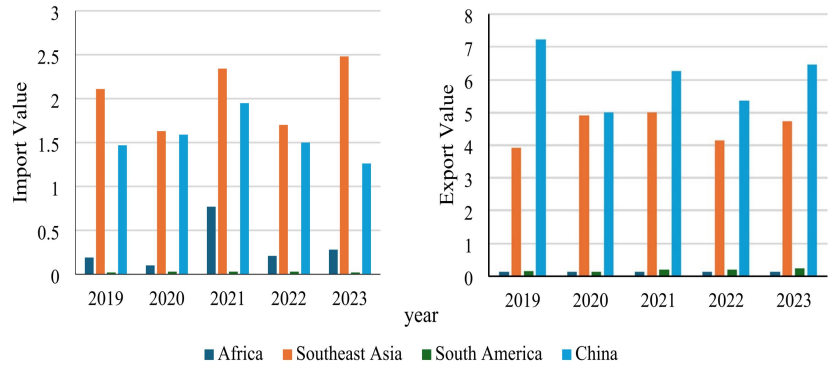


FIGURE 5 | Import and export of tapioca of cassava in major cassava producing regions (2019–2023) (Unit: 10,000 t). *Source:* FAOSTAT.

effective growing season for cassava and lower seedling emergence rates, ultimately leading to reduced yields (Moreno-Cadena et al. 2021). Despite a gradual increase in China's overall cassava production, its dependence on cassava starch imports has continued to grow, with import volumes rising annually. Additionally, China is the largest exporter of cassava tapioca among major cassava-producing regions, with exports steadily increasing since 2020. This trend is influenced by both Chinese dietary habits and the ongoing shift in China's cassava industry toward food applications (Cao et al. 2021; Liu et al. 2020).

2.3 | The Main Challenges of the Cassava Industry in Major Producing Regions

2.3.1 | Africa

Although Africa has abundant sunlight, heat, and land resources, agricultural development still faces significant challenges, such as low soil fertility and seasonal droughts. Even though over 70% of Africa's labor force is engaged in agriculture, factors such as shortages of fertilizers, pesticides, and machinery significantly hinder agricultural development. Additionally, agricultural production technology remains weak, field management practices are underdeveloped, and agricultural techniques are limited. Furthermore, high-yielding, drought-tolerant, and disease-resistant cassava varieties are only cultivated in a limited proportion (Ou et al. 2016; Amelework et al. 2021). Since the 1980s, countries in East and Central Africa have been widely affected by cassava mosaic disease (CMD), which has shown a tendency to spread further into East and Southern Africa. Cassava whiteflies primarily transmit CMD and can cause yield losses of 50%–80% (Xue et al. 2015). In addition, cassava brown streak disease (CBSD) has been spreading in West Africa in recent years (Patil et al. 2015).

2.3.2 | Southeast Asia

As the largest cassava planting country in Southeast Asia and the world's leading exporter of cassava and its processed products, Thailand plays a vital role in the global cassava industry. Although Thailand's climate is mainly tropical monsoon with abundant rainfall, cassava cultivation still faces threats such as occasional drought and limited irrigation water. Additionally, as one of the world's major cassava processing centers, nearly 90% of Thailand's processed raw materials are sourced domestically. Approximately 10% of dried cassava chips and fresh cassava roots need to be imported from Cambodia, Laos, and other neighboring countries, which increases the demand for efficient cold-chain logistics and cassava storage solutions (Weerasak 2021; Sirikul 2015).

Furthermore, Thailand, Laos, and other Southeast Asian countries mainly export cassava products such as dried cassava chips, fresh cassava, and cassava starch, which are primarily processed products. This results in relatively low industrial added value in international trade (Delaquis et al. 2024). Notably, in major cassava-producing countries such as Thailand, Laos, and Cambodia, cultural practices and agricultural conditions result in minimal use of inputs like pesticides and fertilizers, and genetically modified cassava varieties are generally not adopted (Weerasak 2021). As a result, cassava in these regions is highly vulnerable to diseases such as cassava mosaic disease (CMD) and cassava brown streak disease (CBSD). The dominant local cassava varieties have not yet developed resistance to pests and diseases, posing significant challenges for the cassava industry (Wang and Wei 2023; Graziosi et al. 2016; Uke et al. 2022).

2.3.3 | South America

Brazil is the leading cassava-producing country in South America. Although its climate is mainly tropical rainforest and monsoon, with relatively abundant water and heat resources, only 44% of cassava-growing areas had optimal precipitation conditions for cassava growth (annual rainfall between 1000 and 1500 mm) from 1990 to 2020, and only 11% of these areas fell within the ideal temperature range for cassava cultivation. During the same period, Brazil's cassava cultivation area has been steadily declining. Compared to 1970, the country's total annual cassava production has dropped by more than 6 million tons, while the cultivated area has decreased by over 500,000 ha (Bester et al. 2021). The primary reason for this decline is that cassava in Brazil is mainly used for food. Meanwhile, as the processed food industry has expanded rapidly, consumer demand for traditional staples such as cassava, rice, and soybeans has decreased. Additionally, in Brazil, Colombia, and other South American countries, cassava bacterial wilt and other diseases pose significant threats to cassava production (Alvarez et al. 2012).

Furthermore, Brazil's cassava processing industry mainly consists of small and medium-sized businesses, resulting in a market dominated by corn starch rather than cassava starch. This also makes it difficult for cassava starch to compete with U.S. corn starch producers (Demiate and Kotovicz 2011). Among South American countries, only Brazil and Paraguay have the capacity for large-scale cassava starch production. In contrast, most other countries mainly use cassava as a staple food, with underdeveloped cassava processing industries. Additionally, cassava farming in South America is mainly on small farms of less than one hectare, making it difficult to adopt mechanized planting and harvesting. This leads to high production costs and low efficiency (Vilpoux et al. 2017).

2.3.4 | China

Southern China is the main cassava-producing region in the country, characterized by a major subtropical climate. Compared to other major cassava-producing areas worldwide in tropical regions, this area experiences lower rainfall and temperatures, which are unfavorable for cassava cultivation. Additionally, the soil fertility in cassava-producing provinces like Guangdong, Guangxi, and Hainan is generally low (Wei et al. 2021). Furthermore, due to the loss of agricultural labor and imbalanced urban–rural development, some areas have experienced farmland abandonment (Xu et al. 2019), and these abandoned lands tend to have poor soil fertility. Therefore, cultivating cassava in these areas could contribute to land reclamation because

of its adaptability. Provinces such as Guangxi and Guangdong have already introduced supportive policies to encourage this approach (Lin et al. 2024). As a result, there is a need to develop cassava varieties that are tolerant of poor soils and easy to manage in the field, making them suitable for cultivation in abandoned farmland.

Currently, cassava harvesting in China primarily relies on manual labor, leading to high production costs and low economic returns. Besides, existing cassava harvesting machinery faces compatibility issues with agronomic practices (Deng et al. 2019), mainly because different cassava root architectures significantly affect the efficiency and loss rate of mechanized harvesting (Su et al. 2019). Therefore, it is crucial to breed new cassava varieties that are suitable for mechanized harvesting. What is more, China's cassava industry faces threats from pests and diseases. Bacterial wilt disease is the most severe, while brown streak disease affects the largest cultivated area. Moreover, cassava mosaic disease (CMD), the most destructive cassava disease globally, has already invaded the main cassava-producing regions in South China (Shi et al. 2023).

3 | Development and Utilization of Germplasm Resources in Major Cassava Producing Regions

3.1 | Main Approaches to the Development and Utilization of Cassava Germplasm Resources

Currently, cassava germplasm resources development mainly involves selection breeding, mutation breeding, hybrid breeding, and molecular breeding. These methods can be divided into conventional breeding (such as selection breeding, mutation breeding, and hybrid breeding) and modern (molecular) breeding (Chen et al. 2024). At present, conventional breeding methods remain the main approach for cassava germplasm resource development due to their wide application, strong technical feasibility, and technological foundation. However, with the advancement of molecular breeding technologies, including genome editing and genetic modification, along with the completion of whole genome sequencing, a robust technical base has been established for efficient and precise cassava breeding. For instance, the transgenic cassava strain 4046 has been approved and promoted for cultivation in Kenya and other countries (Wagaba et al. 2021).

Regarding cassava germplasm resource conservation, approximately 13,000 germplasm accessions are preserved worldwide, mainly in nine countries across South America, Central Africa, West Africa, and Asia. The leading institutions responsible for cassava germplasm conservation include The Alliance of Bioversity International and the International Center for Tropical Agriculture (Alliance Bioversity & CIAT), International Center for Tropical Agriculture (CIAT), Brazilian Agricultural Research Corporation (Embrapa), International Institute of Tropical Agriculture (IITA), and Chinese Academy of Tropical Agricultural Sciences (CATAS). Among them, Alliance Bioversity & CIAT has the world's most extensive cassava germplasm collection, preserving 5577 traditional cultivated varieties from 141 countries and 386 wild species, making it the world's leading cassava germplasm repository (Kanaabi et al. 2024). Additionally, CIAT assisted CATAS to establish China's National Cassava Germplasm Repository, which stores over 3000 germplasm accessions, covering approximately 80% of the world's key cassava germplasm resources (Li et al. 2025).

Institutions with extensive cassava germplasm collections usually have more advantages in conducting fundamental research on germplasm resource development. For example, Alliance Bioversity & CIAT has created a conventional cassava breeding "formula" that improves the efficiency and accuracy of the cassava breeding process (Ceballos et al. 2021), helping cassava enterprises to develop desired germplasm resources, such as cassava varieties with different amylose and amylopectin ratios for starch industries or high protein cassava germplasm for animal feed industries (Ceballos et al. 2007, 2008). CATAS, using its national cassava germplasm repository and integrating germplasm genotype data, has identified key genes linked to cassava starch synthesis, bacterial wilt disease formation, and control. These findings provide important intellectual property protection for cassava germplasm innovation (Hu et al. 2021). CATAS and Hainan University have collaborated to establish a cassava germplasm evaluation platform to support cassava breeding research and development.

3.2 | Current Status of Germplasm Resources Development and Utilization in Major Cassava Producing Regions

3.2.1 | Africa Mainly Focuses on Addressing Environmental Stress, Enhancing Nutritional Content, and Improving Resistance to Diseases and Pests

As shown in Figure 6, in recent years, Nigeria, with assistance from the International Institute of Tropical Agriculture (IITA), has developed and tested drought-tolerant cassava germplasm resources. Additionally, RNAi-mediated technology has been used to improve the resistance of several widely cultivated cassava varieties in Africa against cassava mosaic disease (CMD) and brown streak disease (CBSD), while also increasing their iron and zinc content (Narayanan et al. 2021). Uganda, in collaboration with the International Atomic Energy Agency (IAEA) and the Food and Agriculture Organization (FAO), employed radiation-induced mutagenesis to develop cassava germplasm resistant to pests (Apio et al. 2024). Furthermore, through the African Cassava Whitefly Project (ACWP), Uganda has developed a cassava variety, Mkumba, which is resistant to whitefly infestations (Sam et al. 2024). Kenya became the first country in the world to develop the transgenic cassava variety 4046, which not only effectively resists cassava brown streak disease (CBSD) but also increases cassava yield. Additionally, Kenya has developed the early maturing and drought-tolerant variety, Katune (Industrial Economics Research Office of CCARS 2020). Ghana, in collaboration with IITA, has combined genotypic evaluation, hybridization, and selection with conventional breeding techniques to introduce high-β-carotene, high-yielding, and CMD-resistant cassava varieties, including Game Changer and Baba-70 (Industrial Economics Research Office of CCARS 2022).

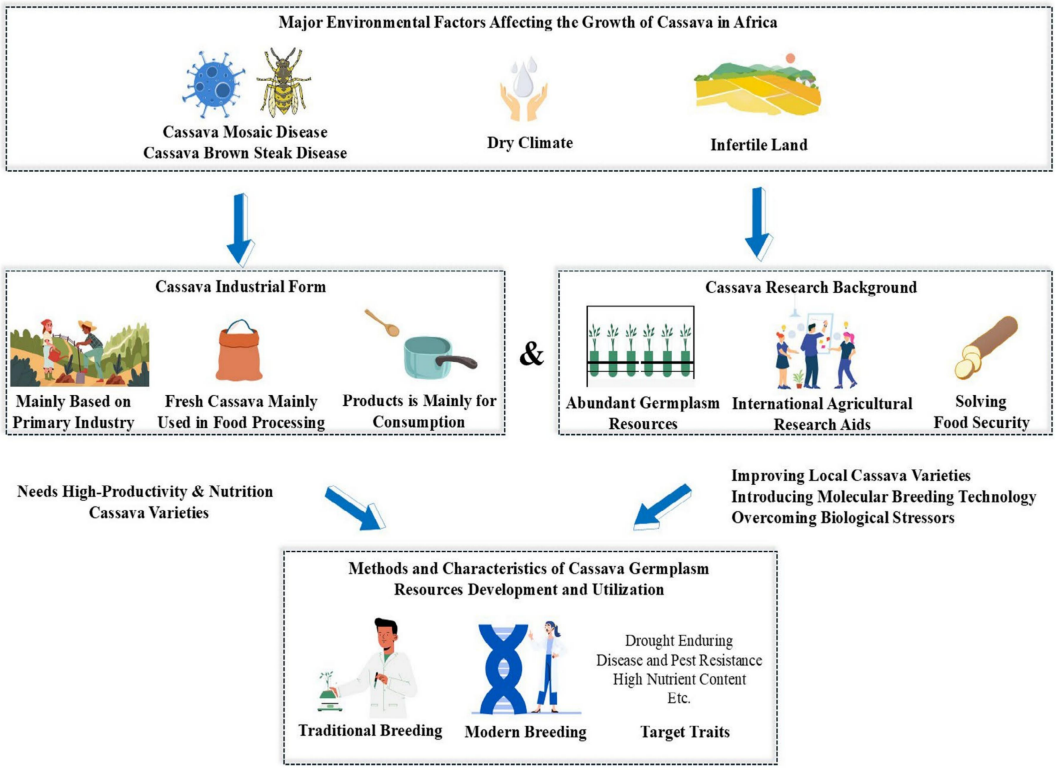


FIGURE 6 | Current status and influence factors of cassava germplasm resource development in Africa.

3.2.2 | Southeast Asia Mainly Focuses on Identifying High-Quality Germplasm, Breeding High-Yielding, Organic, and Disease-Resistant Varieties

As shown in Figure 7, since 2020, Thailand has promoted cassava varieties adapted to organic cultivation in its eastern and northern regions (Kumsueb et al. 2023). Also, it has engaged in breeding cassava varieties resistant to mosaic disease (Uke et al. 2022). In 2023, Thailand evaluated six cassava varieties based on fresh root yield, post-harvest storage, and starch content, aiming to establish a basis for selecting high-quality cassava germplasm resources (Yuanjit et al. 2023). In 2022, Vietnam conducted molecular analysis on 1570 cassava varieties across six agricultural ecological zones, laying the foundation for future breeding works and germplasm conservation (Ocampo et al. 2021).

Although India is part of South Asia, its industrial development and climate conditions are similar to those of Southeast Asian countries. In 2021, the Central Tuber Crops Research Institute of India developed and promoted the cassava variety Sree Reksha, which features high post-harvest storability, high yield, and disease resistance (Visalakshi et al. 2023). In 2024, the institute further developed Sree Kaveri, which not only retains disease resistance but also demonstrates higher yield, chlorophyll content, and starch content compared with over 30 internationally recognized cassava varieties (The Hindu Bureau 2024).

3.2.3 | South America Mainly Focuses on Breeding Edible Cassava Varieties

As shown in Figure 8, as the major cassava-producing country in South America, Brazil developed and promoted six edible cassava varieties in 2019: BRS 396, BRS 397, BRS 398, BRS 399, BRS 400, and BRS 401 (Luiz and Chen 2020). In addition, in 2021, Brazilian researchers sequenced genomes of 3354 local and modern cassava varieties to enhance the efficiency of modern breeding (Ogbonna et al. 2021). In the same year, studies were conducted on AO-109, AO-53, AO-82, and AO-79 genotypes to develop new edible cassava varieties in Brazil (da Costa Nunes et al. 2021). In 2022, using modern breeding technologies, Brazil recombined 30 cassava genotypes, resulting in a new variety that has 27.05% higher carotenoid content, 23.03% lower cyanide content, and 22.72% higher fresh root yield compared to traditional varieties (de Carvalho et al. 2022).

3.2.4 | China is Guided by the National Food Security Strategy and Aims to Promote the Development of the Edible Cassava Industry

As illustrated in Figure 9, China has recently secured national food security by promoting the development of the cassava industry (Lin and Yuan 2025; Huang 2025). Firstly, China has expanded cassava cultivation to ensure a sufficient starch supply by conducting cassava-driven rehabilitation of abandoned

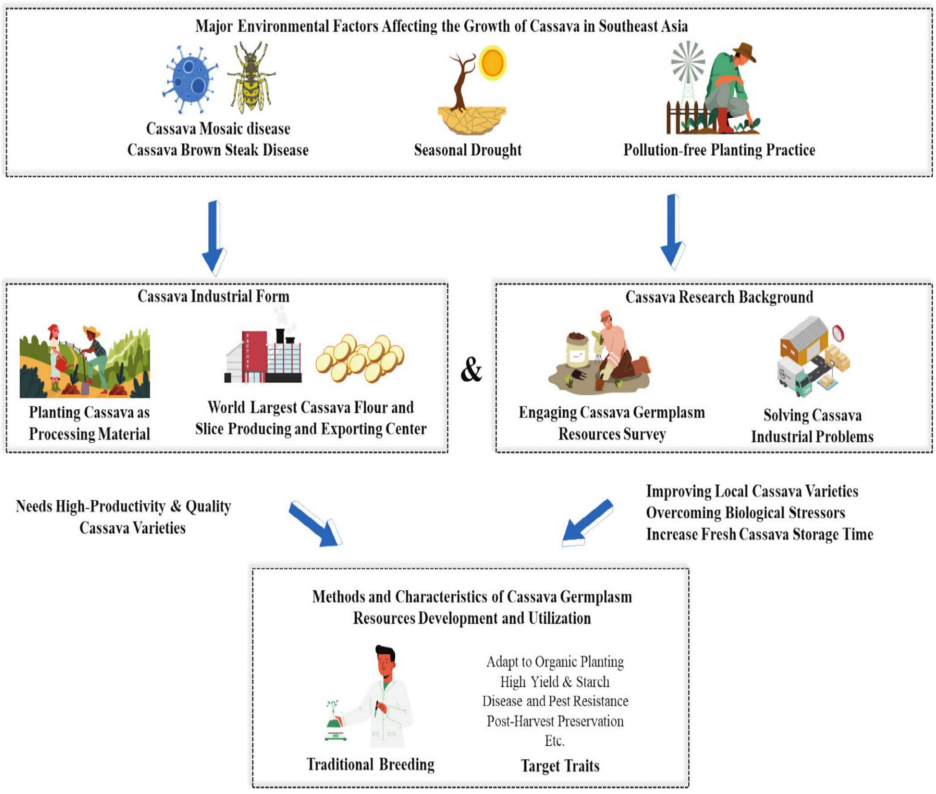


FIGURE 7 | Current status and influence factors of cassava germplasm resource development in Southeast Asia.

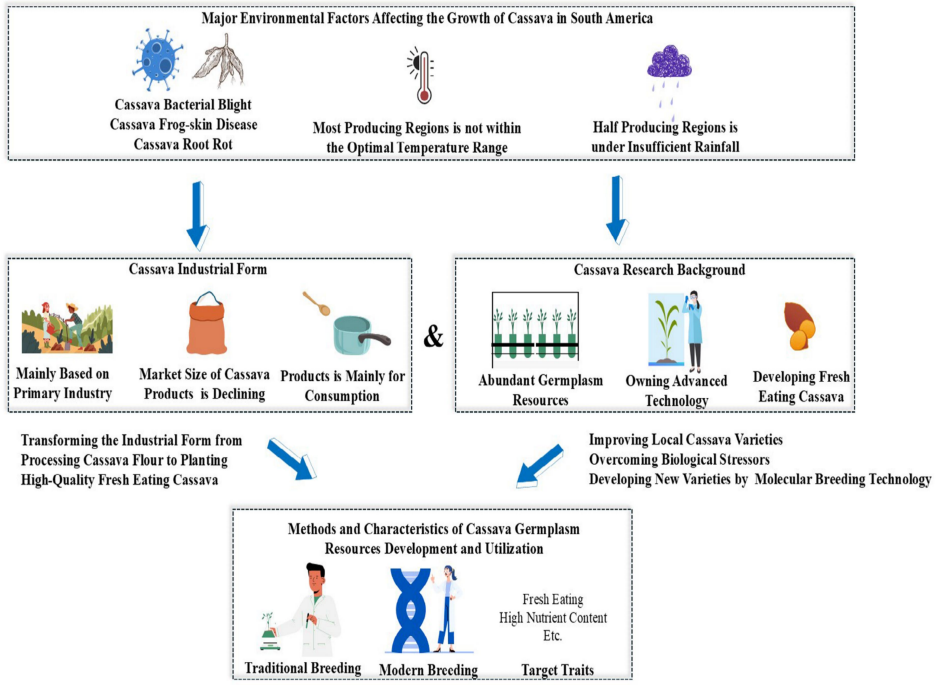


FIGURE 8 | Current status and influence factors of cassava germplasm resource development in South America.

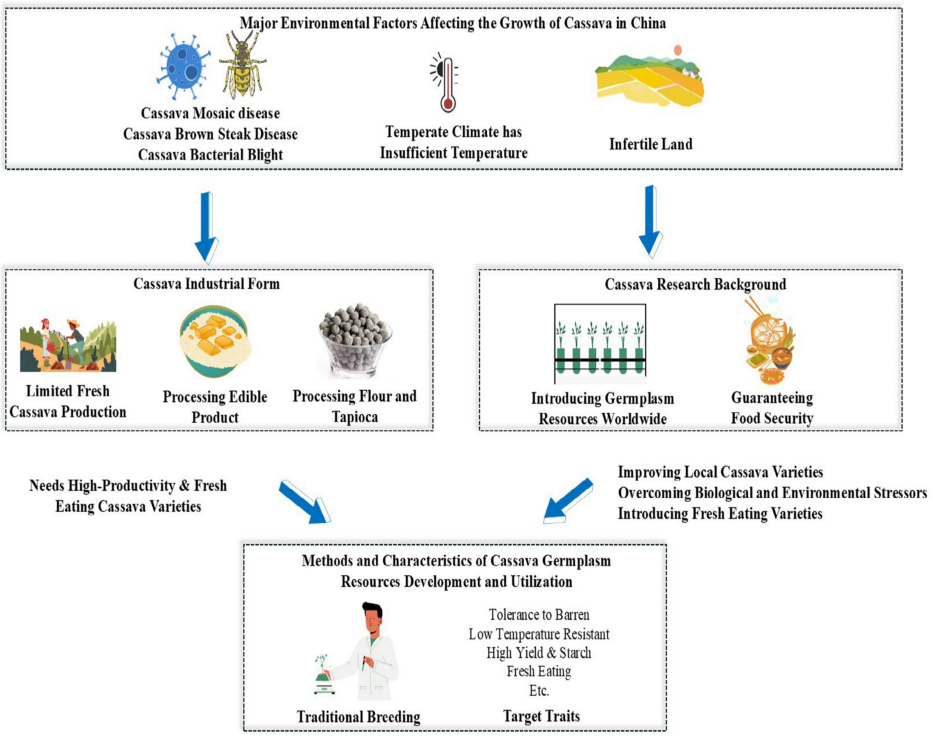


FIGURE 9 | Current status and influence factors of cassava germplasm resource development in China.

land in South China and extending cassava planting into northern regions. To support this, China has continuously screened salt-tolerant cassava germplasms in recent years, focusing on physiological and biochemical indicators of both domestic and international cassava varieties, including Rayong 90, F03P, South China 124, Rayong 9, and South China 8. After analysis, South China 8 was identified as the most salt-tolerant germplasm (Lv 2019). Additionally, to promote cassava cultivation in temperate zones, China has initiated research since 2021 to improve cold resistance through studies of the MeZAT11 and LncRNA-114 genes (Ma 2022; Dong 2021), as well as the functional characterization of the lncRNA-CRR5 genotype under low-temperature stress (Shen et al. 2021).

Secondly, improving starch content, yield, pest, and disease resistance of existing cassava varieties is essential. For example, the Guangxi Tropical Crops Research Institute introduced hybrid cassava germplasm resources from the International Center for Tropical Agriculture (CIAT) and further developed Guire 12, a high-yield, cold-tolerant variety with high starch content and resistance to spider mites and bacterial wilt disease (Zhao et al. 2023). Since 2021, Chinese researchers have used CRISPR/Cas9 technology to create double mutants of MeSTP7 and MeSTP15, developing new germplasms resistant to cassava mosaic disease (Geng et al. 2022). Studies on MeSAP13 and MeUGT41 genes have clarified their roles in bacterial wilt resistance, providing a theoretical foundation for biotechnology-based germplasm development (Zhang, Yang, et al. 2022; Li et al. 2023). In addition, research into α-HNL, β-glucosidase, LOX2, OPR3, and JAR1 genes has advanced breeding efforts for cassava varieties resistant to two-spotted spider mites in 2022 (Wu et al. 2022; Han et al. 2022).

With the growth of China's edible cassava industry, researchers developed Guire 10 in 2020, a low-cyanide, fresh-eating variety with high amylopectin content and a glutinous texture suitable for dessert applications (Chen et al. 2021). In addition, molecular marker-assisted breeding has further introduced edible cassava varieties rich in β-carotene, low in cyanogenic glycosides, and with a soft texture (Xu et al. 2023). Overall, traditional edible varieties include Guire 9, South China 9, Guire 891, and Bread Cassava 1 & 2, which are widely cultivated in China's major cassava-producing regions. What is more, to improve mechanization and post-harvest preservation, Guire 8 was bred in 2023 using molecular markers featuring traits such as low cyanide content, high yield, adaptability, and suitability for dense planting and mechanical harvesting (Lu et al. 2023). In 2024, research on the MeEIN3.1 gene involved in post-harvest ethylene signaling aimed to develop cassava germplasms resistant to physiological deterioration (Lai et al. 2024).

3.3 | The Features of Germplasm Resources Development and Utilization in Major Cassava Producing Regions

3.3.1 | The Development of Germplasm Resources in Major Cassava Producing Regions Is Closely Related to the Industry Environment

Since germplasm resources are a key factor in driving agricultural industry development, the development direction of cassava germplasm resources in major cassava-producing

regions worldwide is closely tied to the industrial development environment.

Firstly, the development of cassava germplasm resources is closely related to regional food security. In regions where cassava is a primary food source, such as Africa, efforts focus on developing cassava germplasm rich in β-carotene to address local nutritional deficiencies (Tize et al. 2021; Otun et al. 2023; Afolami et al. 2021). In contrast, in regions where cassava is eaten but residents have relatively sufficient nutrition, such as South America and China, efforts are aimed at developing high-quality edible cassava germplasm, emphasizing traits such as high glutinousness and low toxicity (da Costa Nunes et al. 2021; de Carvalho et al. 2022; Lv 2019; Xu et al. 2023). Additionally, under China's policies promoting a "big food concept", efforts are being made to expand cassava cultivation from subtropical to temperate regions and to encourage planting on fallow land in major production areas (Lv 2019; Dong 2021; Shen et al. 2021). As a result, germplasm development increasingly focuses on traits such as cold, barren soil, and salt-alkali tolerance.

Secondly, the direction of cassava germplasm development is also influenced by regional industrial structures. For example, Southeast Asia, as the world's largest processor of cassava starch and dried chips, emphasizes increasing starch content, which directly impacts product yield and quality. As a result, germplasm development in the region targets high yield and high starch content (Yuanjit et al. 2023; Ocampo et al. 2021). Meanwhile, Thailand's fresh cassava is mainly exported to high-end markets in Asia, creating a preference for germplasm resources with high added value (Kumsueb et al. 2023; Weerasak 2021). Additionally, because of Southeast Asia's high temperatures, post-harvest preservation of fresh cassava influences processing efficiency. Therefore, cassava breeding also aims to develop varieties that are easier to store after harvest (Visalakshi et al. 2023).

Thirdly, the natural environment also influences the direction of cassava germplasm development. While cassava cultivation worldwide faces common biological stress challenges, such as cassava mosaic disease and brown streak disease, different regions customize germplasm development to address their specific pest and disease pressures (Uke et al. 2022; Narayanan et al. 2021; Zhang, Li, et al. 2022; Li et al. 2023). Additionally, cassava germplasm development varies based on local agricultural conditions, including temperature, precipitation, and infrastructure. For example, Africa emphasizes more on drought tolerance and early-maturing cassava varieties (Industrial Economics Research Office of CCARS 2020), whereas China considers factors such as salt tolerance and cold resistance in its breeding programs (Lv 2019; Ma 2022; Dong 2021; Shen et al. 2021).

3.3.2 | Resistance to Diseases and Pests Is Becoming a Vital Trait

The importance of disease resistance traits in developing new cassava varieties highlights several key points. First, cassava diseases, especially Cassava Mosaic Disease (CMD) and Cassava Brown Streak Disease (CBSD), pose a threat to global cassava production. Although different regions that grow cassava experience varying levels of disease pressure, both CMD and CBSD are now spreading worldwide. CMD alone can cause yield losses of 50%–80% in fresh cassava roots while also significantly reducing starch content. CBSD can lead to yield reductions of up to 70% and decrease the levels of amylose, amylopectin, and total starch by 30%, 50%, and 15%, respectively (Legg et al. 2006). Africa has the lowest cassava yield among major cassava-producing regions, mainly because of the widespread cultivation of unimproved, disease-susceptible varieties, especially those lacking resistance to CMD and CBSD (Mulenga et al. 2018; Legg et al. 2017).

Secondly, the risk of CMD and CBSD is growing. The whitefly, the primary vector of these diseases, cannot survive at temperatures above 36°C. However, studies suggest that global climate change may increase whitefly activity, exacerbating the worldwide spread of CMD and CBSD (Robson et al. 2024). Moreover, the expansion of international cassava trade provides additional pathways for the transmission of these diseases.

Thirdly, Genetic modification (GM) technology is emerging as an effective method to improve cassava resistance to pests and diseases. The scientific community widely recognizes GM as a highly effective method for developing disease-resistant cassava (Chikoti and Tembo 2022). For example, in 2020, the International Center for Tropical Agriculture (CIAT) provided Vietnam and Thailand with cassava varieties containing the CMD2 gene, which demonstrated resistance to Sri Lanka's Cassava Mosaic Virus in experiments (Ceballos et al. 2020). Additionally, ongoing research into cassava germplasm resources has led scientists to identify cassava varieties in Africa and the crop's native regions in the Americas that naturally possess resistance traits against CMD and CBSD. These findings contribute to the foundation for developing transgenic cassava varieties with improved disease resistance (Bhaargavi et al. 2024; Ospina et al. 2024).

3.3.3 | The Cassava Industry Increasingly Demands Greater Accuracy and Efficiency in Modern Breeding Technologies

With the advancement of gene sequencing technology, high-throughput, large-scale sequencing of cassava germplasm has been achieved. Researchers have begun identifying regulatory genes for crop traits based on genome sequencing. Specifically, once the key genes controlling target traits are identified, scientists could utilize gene editing and transgenic technologies to achieve precise breeding quickly and efficiently, which significantly shortens the breeding cycle and allows the development of genetically stable varieties with multiple target traits (Chen et al. 2024).

As a result, modern breeding technologies can more effectively address challenges in cassava germplasm resource development. For example, in China, traditional high-yield, edible, and high-starch cassava varieties (such as the Nanzhi, South China, Guimushu, and Guire varieties) were primarily developed through selection, hybridization, mutation breeding, and introduction breeding (Chen et al. 2021; Zhao et al. 2023; Li et al. 2021). Recently, to develop disease and pest-resistant

cassava varieties timely in response to biological stresses such as cassava mosaic disease and to cultivate cold-tolerant germplasm for expanding cassava into northern regions, researchers have increasingly adopted innovative methods, including molecular markers, functional trait identification, gene screening, and editing technologies for germplasm development (Lv 2019; Ma 2022; Dong 2021; Shen et al. 2021). Additionally, genome editing technology allows for targeted deletion, insertion, and replacement of specific gene segments. In 2021, Kenya successfully cultivated and promoted transgenic cassava 4046, which is resistant to brown streak disease (Chege et al. 2024).

To comprehensively improve cassava germplasm resources, cassava-producing regions have actively developed germplasm repositories and advanced genome sequencing efforts. In China, a national cassava germplasm repository has been established, and whole-genome sequencing projects for cassava are continuously promoted (Li et al. 2025). In Nigeria, to combat cassava mosaic disease, researchers have established a global open cassava database containing 2700 breeding trials and 11.2 million genetic data points (Industrial Economics Research Office of CCARS 2023). Similarly, Southeast Asian countries such as Thailand and Vietnam have also begun genome sequencing efforts to catalog their national cassava germplasm resources (Yuanjit et al. 2023; Ocampo et al. 2021).

3.3.4 | International Organizations Driven the Development of Cassava Germplasm Resources in Major Production Regions

Currently, the leading international organizations in cassava germplasm development and utilization include the International Center for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA), both of which are part of the Consultative Group on International Agricultural Research (CGIAR). These organizations have played an important role in helping developing countries develop cassava germplasm, especially in Africa (Malik et al. 2020; Kawano 2003; Lv 2019; Ceballos et al. 2021). In recent years, the International Institute of Tropical Agriculture (IITA) introduced cassava greenhouse breeding technology in Nigeria. The newly developed cassava varieties include Game Changer, Obasanjo-2, Hope, Poundable, Baba-70, TME 419, Farmer's Pride, Dixon, Ayaya, Sunshine, and Fine Face, all of which achieved yields exceeding 20 tons per hectare (t/ha), far above the local average yield (Industrial Economics Research Office of CCARS 2021a). The International Center for Tropical Agriculture (CIAT) helped Laos establish a cassava stem propagation center in 2021 (Industrial Economics Research Office of CCARS 2021b).

Since the 1980s, the Chinese Academy of Tropical Agricultural Sciences (CATAS) has cooperated with CIAT, which has provided China with over 900 cassava germplasm resources. This partnership has led to the development of 14 cassava varieties in the South China series and the initiation of several genome-wide association studies on cassava. Through this collaboration, a cassava genomic research database and portal was established, helping China achieve internationally leading results in cassava whole-genome sequencing and comparative genomics research (Liang et al. 2024).

4 | Advice for the Development and Utilization of Germplasm Resources in Major Cassava Producing Regions

4.1 | Africa Could Develop High-Quality Cassava Varieties to Strengthen Food Security

Africa faces more challenges in food security than other regions. According to FAOSTAT data, the prevalence of food insecurity in Africa has consistently been about twice the global average. As a staple food in Africa, cassava plays a vital role in ensuring food security. In Africa, cassava is mainly processed into Garri, Ugali, and Fufu. These cassava-based foods share a common feature: they are made from cassava flour, which is fermented and baked as staples alongside other dishes (Ndudi et al. 2024; Fayemi and Ojokoh 2014). As a result, the yield and starch content of fresh cassava roots directly influence the production of cassava-based foods. Therefore, developing high-yield, high-starch cassava germplasm resources is crucial for strengthening Africa's food security. Additionally, with the development of fresh-eating cassava varieties worldwide, Africa could also focus on breeding fresh-eating varieties with low cyanogenic glucoside content. Moreover, as mentioned above, cassava diseases like CMD and CBSD could significantly decrease cassava yield in Africa; therefore, it is also important to improve the development of disease-resistant varieties.

On the other hand, Africa's cassava yield per unit area is lower than that of other regions. However, with the widespread adoption of improved cassava varieties and the development of agricultural infrastructure, Africa's total cassava production is expected to increase significantly. This makes cultivating high-starch cassava varieties not only beneficial for food security but also important for integrating cassava into processing and manufacturing industries. It drives the development of higher-value sectors, such as modified cassava starch and bioethanol production, thereby boosting economic growth in the region.

4.2 | Southeast Asia Could Cultivate Cassava Varieties to Meet the Processing Demands

As the world's largest exporter of cassava and its products, Southeast Asia accounted for over 95% of global exports of fresh cassava roots, dried cassava chips, and cassava starch in 2023 (FAOSTAT). Given its dominant role in the global cassava trade, the development and utilization of cassava germplasm resources in Southeast Asia should focus on supporting the region's cassava industry.

Firstly, Southeast Asia already has the highest cassava yield per unit area in the world (FAOSTAT). Therefore, to support its cassava chips and starch processing industries, the region should focus on developing cassava germplasm resources that are high-yielding, high-starch, and suitable for mechanization. This includes varieties optimized for mechanical planting, harvesting, peeling, and milling, which would increase production efficiency and reduce labor costs in cassava processing (Deng et al. 2019). Additionally, due to the large processing volume and the perishability of fresh cassava, it is essential to develop cassava varieties with improved post-harvest storage characteristics. Moreover,

it is also important to develop high-starch content varieties to strengthen the cassava processing industry.

Secondly, in some countries such as Thailand, certain cassava farmers still practice traditional, fertilizer-and pesticide-free manual cassava cultivation (Weerasak 2021). However, within the smallholder farming model, cassava yields remain relatively low, making it difficult to achieve economies of scale while labor costs stay high. To overcome this issue, Southeast Asia should encourage the development of high-quality edible cassava varieties and those adapted to organic planting methods. These varieties could support small-scale farming practices by increasing the added value of fresh cassava exports.

4.3 | South America Could Cultivate Fresh-Eating Cassava Varieties and Explore the Potential of Cassava as Animal Feed

One reason for the decline in total cassava production in the Americas is the decreasing demand for cassava due to competition from convenience foods. In South American countries such as Brazil, traditional cassava-based foods like Farinha are made by fermenting cassava flour. Some studies suggest that African cassava foods like Garri, Ugali, and Fufu were introduced to Africa from the Americas along with cassava (Parmar et al. 2017). These traditional cassava foods mainly serve as energy sources. However, as food industries develop and consumer preferences shift toward more diverse and convenient options, they are gradually becoming less popular in daily diets. Nevertheless, South America has valuable fresh-eating cassava germplasm resources, such as Amarelinha do Amapá (Parmar et al. 2017). By developing high-quality fresh-eating cassava varieties, the region could meet consumer demand for healthy, high-quality diets and improve the competitiveness of the cassava industry.

Moreover, South America is also one of the world's major livestock-producing regions, with a highly developed cattle industry. The region's share of global beef production increased from 22.39% in 2014 to 22.89% in 2023, while total production grew from 15.63 million tons to 17.52 million tons, marking a 12.13% rise (FAOSTAT). Therefore, cassava has significant potential as an animal feed ingredient. Its proteins and starch supply essential energy for livestock, while natural lactic acid bacteria and yeast in cassava flour could help digestion. Additionally, the trace amounts of hydrogen cyanide naturally found in cassava can act as a mild antimicrobial agent (Howeler et al. 2013). To harness this potential, South America could focus on breeding high-protein, high-starch cassava varieties and developing traits that are mechanization-friendly. This would allow better integration of cassava into the livestock industry, fostering a sustainable and efficient agricultural system.

4.4 | China Could Consider Both Domestic Demand and International Cooperation When Developing Cassava Varieties

The development of China's cassava germplasm resources should align with the current state of the domestic cassava industry and the national food security strategy. For example, in response to the high reliance on imported cassava starch, efforts should focus on developing high-yielding varieties with high-starch content. Additionally, considering the rising trend of the fresh-eating cassava industry, it is necessary to cultivate edible varieties that have good palatability and are resistant to low temperatures, infertility, and saline-alkali soil stress. Moreover, cassava is also an important raw material in paper making, textile, and modified starch processing (Shittu et al. 2016), which is vital to China's manufacturing sector, so China should also focus on developing special cassava varieties with specific starch qualities, such as high-viscosity and high-transparency.

Furthermore, research institutions such as the Chinese Academy of Tropical Agricultural Sciences have already launched agricultural technology assistance programs for cassava in regions such as Africa and Southeast Asia (Li et al. 2025). Notably, China's Belt and Road Initiative (BRI) primarily fosters cooperation with countries in Africa and Southeast Asia. In 2023, China had signed BRI cooperation agreements with over 150 countries, including the world's top ten cassava-producing nations, which together made up 70.80% of global cassava production in 2023 (FAOSTAT). In the future, China could leverage its advantages in cassava germplasm resources and agricultural technologies to engage in multi-sector agricultural cooperation with other BRI partner countries. The initial focus can be on common development areas such as breeding disease-and pest-resistant cassava germplasm, developing cassava varieties suited for mechanized harvesting, and advancing modern molecular breeding techniques for cassava. Subsequently, China could establish targeted cassava-related agricultural collaborations based on specific cooperation frameworks with individual BRI countries.

Ethics Statement

The authors have nothing to report.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Adebayo, W. G. 2023. "Cassava Production in Africa: A Panel Analysis of the Drivers and Trends." *Heliyon* 9, no. 9: e19939.

Afolami, I., M. N. Mwangi, F. Samuel, et al. 2021. "Daily Consumption of Pro-Vitamin A Biofortified (Yellow) Cassava Improves Serum Retinol Concentrations in Preschool Children in Nigeria: A Randomized Controlled Trial." *American Journal of Clinical Nutrition* 113, no. 1: 221–231.

Alvarez, E., G. A. Llano, and J. F. Mejía. 2012. *Cassava Diseases in Latin America, Africa and Asia*, 258. CASSAVA HANDBOOK.

Amelework, A. B., M. W. Bairu, O. Maema, S. L. Venter, and M. Laing. 2021. "Adoption and Promotion of Resilient Crops for Climate Risk Mitigation and Import Substitution: A Case Analysis of Cassava for South African Agriculture." *Frontiers in Sustainable Food Systems* 5: 617783.

Apio, H. B., W. Elegba, W. Nunekpeku, et al. 2024. "Effect of Gamma Irradiation on Proliferation and Growth of Friable Embryogenic Callus and In Vitro Nodal Cuttings of Ugandan Cassava Genotypes." *Frontiers in Plant Science* 15: 1414128. https://doi.org/10.3389/fpls.2024.1414128.

Bester, A. U., I. R. Carvalho, J. A. G. D. Silva, et al. 2021. "Three Decades of Cassava Cultivation in Brazil: Potentialities and Perspectives." *Revista Colombiana De Ciencias Hortícolas* 15, no. 2: e12087. https://doi.org/10.17584/rcch.2021v15i2.12087.

Bhaargavi, R., T. K. S. Latha, T. Makeshkumar, and S. Harish. 2024. "Cassava Mosaic Disease: Strategies for Recovery and Sustainable Management." *Australasian Plant Pathology* 54: 1–12. https://doi.org/10.1007/s13313-024-01014-1.

Cao, S., J. Chen, F. Huang, et al. 2021. "Development Status and Countermeasures of Cassava Industry in Guangxi." *Journal of Southern Agriculture* 52, no. 6: 1468–1476.

Ceballos, H., C. Hershey, C. Iglesias, and X. Zhang. 2021. "Fifty Years of a Public Cassava Breeding Program: Evolution of Breeding Objectives, Methods, and Decision-Making Processes." *Theoretical and Applied Genetics* 134, no. 8: 2335–2353. https://doi.org/10.1007/s00122-021-03852-9.

Ceballos, H., P. Kulakow, and C. Hershey. 2012. "Cassava Breeding: Current Status, Bottlenecks and the Potential of Biotechnology Tools." *Tropical Plant Biology* 5: 73–87.

Ceballos, H., C. Rojanaridpiched, C. Phumichai, et al. 2020. "Excellence in Cassava Breeding: Perspectives for the Future." *Crop Breeding, Genetics and Genomics* 2, no. 2: e200008. https://doi.org/10.20900/cbgg20200008.

Ceballos, H., T. Sánchez, K. Denyer, et al. 2008. "Induction and Identification of a Small-Granule, High-Amylose Mutant in Cassava (*Manihot esculenta* Crantz)." *Journal of Agricultural and Food Chemistry* 56, no. 16: 7215–7222.

Ceballos, H., T. Sánchez, N. Morante, et al. 2007. "Discovery of an Amylose-Free Starch Mutant in Cassava (*Manihot esculenta* Crantz)." *Journal of Agricultural and Food Chemistry* 55, no. 18: 7469–7476.

Chege, P., J. Njagi, J. Komen, G. Ngure, J. Muriuki, and M. Karembu. 2024. "Best Practices for Acceptability of GM Crops Field Trials Conclusions: Lessons for Africa." *GM Crops & Food* 15, no. 1: 222–232.

Chen, B. 2024. "Cassava Along the Congo River." *Hainan Daily* 24872: A05.

Chen, R., S. Zhou, D. Wei, et al. 2021. "Breeding and Cultivation Techniques of a Edible Cassava Variety Guire 10." *Journal of Agricultural Research and Application* 34, no. 6: 14–19.

Chen, S., J. Cai, F. An, et al. 2024. "Current Status and Development Trend of Cassava Breeding." *Scientia Sinica Vitae* 54, no. 10: 1833–1842.

Chikoti, P. C., and M. Tembo. 2022. "Expansion and Impact of Cassava Brown Streak and Cassava Mosaic Diseases in Africa: A Review." *Frontiers in Sustainable Food Systems* 6: 1076364. https://doi.org/10.3389/fsufs.2022.1076364.

Cock, J. H. 1982. "Cassava: A Basic Energy Source in the Tropics." *Science* 218, no. 4574: 755–762.

Cock, J. H., and D. J. Connor. 2021. "Cassava." In *Crop Physiology Case Histories for Major Crops*, 588–633. Academic Press.

da Costa Nunes, E., V. G. Uarrota, R. Moresco, and M. Maraschin. 2021. "Physico-Chemical Profiling of Edible or Sweet Cassava (*Manihot esculenta* Crantz) Starches From Brazilian Germplasm." *Food Bioscience* 43: 101305. https://doi.org/10.1016/j.fbio.2021.101305.

de Carvalho, R. R. B., M. Bandeira e Sousa, L. A. de Oliveira, and E. J. de Oliveira. 2022. "Phenotypic Diversity and Selection in Biofortified Cassava Germplasm for Yield and Quality Root Traits." *Euphytica* 218, no. 12: 173. https://doi.org/10.1007/s10681-022-03125-6.

Delaquis, E., C. J. Almekinders, S. de Haan, et al. 2024. "Public and Private Institutional Arrangements for Early Generation Seed Production: Cassava Seed Value Chains in Southeast Asia." *Agricultural Systems* 221: 104131.

Demiate, I. M., and V. Kotovicz. 2011. "Cassava Starch in the Brazilian Food Industry." *Food Science and Technology* 31: 388–397. https://doi.org/10.1590/S0101-20612011000200017.

Deng, G., X. He, Y. Lv, et al. 2019. "Study on Wide and Narrow Double-Row Ridging Cultivation Mode and Mechanized Planting of Cassava." *Guangdong Agricultural Sciences* 46, no. 5: 142–148. https://doi.org/10.16768/j.issn.1004-874X.2019.05.020.

Dong, S. 2021. "Functional Analysis of Inc RNA-I14 in Response to Low Temperature in Cassava [Master's Thesis, Hainan University]." https://doi.org/10.27073/d.cnki.ghadu.2021.001465.

Fayemi, O. E., and A. O. Ojokoh. 2014. "The Effect of Different Fermentation Techniques on the Nutritional Quality of the Cassava Product (Fufu)." *Journal of Food Processing and Preservation* 38, no. 1: 183–192.

Feyisa, A. S. 2021. "Current Status, Opportunities, and Constraints of Cassava Production in Ethiopia-A Review." *Journal of Agriculture and Food Research* 11, no. 3: 51.

Geng, S., J. Zhang, X. Wang, et al. 2022. "Construction of Me STP7 and Me STP15 Double Mutants in Cassava Based on CRISPR/Cas9 Technology." *Chinese Journal of Tropical Crops* 43, no. 3: 463–472 (In Chinese).

Graziosi, I., N. Minato, E. Alvarez, et al. 2016. "Emerging Pests and Diseases of South-East Asian Cassava: A Comprehensive Evaluation of Geographic Priorities, Management Options and Research Needs." *Pest Management Science* 72, no. 6: 1071–1089. https://doi.org/10.1002/ps.4250.

Han, Z., Q. Chen, X. Liang, et al. 2022. "Influence on Expression of Jasmonic Acid Signaling Pathway Gene in Tetranychus Urticae Fed on Mite-Resistant and Mite-Susceptible Cassava Cultivars." *Biotechnology Bulletin* 38, no. 6: 211–220.

Howeler, R. H., N. Lutaladio, and G. Thomas. 2013. *Save and Grow: Cassava: A Guide to Sustainable Production Intensification*, 1–129. Food and Agriculture Organization of the United Nations.

Hu, W., C. Ji, Z. Liang, et al. 2021. "Resequencing of 388 Cassava Accessions Identifies Valuable Loci and Selection for Variation in Heterozygosity." *Genome Biology* 22: 1–23.

Huang, S. 2025. "SWOT Analysis and Development Countermeasures of Edible Cassava Industry in Guangxi Under the Background of Rural Revitalization." *Journal of Anhui Agricultural Sciences* 53, no. 12: 168–172.

Industrial Economics Research Office of CCARS. 2020. *Industry Information Weekly No.117*. Chinese Cassava Agro-technology Research System. http://www.cassava.org.cn/article.aspx?id=444.

Industrial Economics Research Office of CCARS. 2021a. *Industry Information Weekly No.128*. Chinese Cassava Agro-technology Research System. http://www.cassava.org.cn/article.aspx?id=463.

Industrial Economics Research Office of CCARS. 2021b. Industry Information Weekly No.136. Chinese Cassava Agro-Technology Research System. http://www.cassava.org.cn/article.aspx?id=475.

Industrial Economics Research Office of CCARS. 2022. *Industry Information Weekly No.193*. Chinese Cassava Agro-technology Research System. http://www.cassava.org.cn/article.aspx?id=582.

Industrial Economics Research Office of CCARS. 2023. *Industry Information Weekly No.241*. Chinese Cassava Agro-technology Research System. http://www.cassava.org.cn/article.aspx?id=721.

Jing, F., Y. Wang, and M. Ning. 2021. "Thinking About the Problem of Crop Seed Source "Sticking Neck"." *Issues in Agricultural Economy* 11: 55–65.

Kanaabi, M., F. B. Namakula, E. Nuwamanya, et al. 2024. "Rapid Analysis of Hydrogen Cyanide in Fresh Cassava Roots Using NIRSand Machine Learning Algorithms: Meeting End User Demand for Low Cyanogenic Cassava." *Plant Genome* 17, no. 2: e20403. https://doi.org/10.1002/tpg2.20403.

Kawano, K. 2003. "Thirty Years of Cassava Breeding for Productivity—Biological and Social Factors for Success." *Crop Science* 43, no. 4: 1325–1335.

Kongsil, P., H. Ceballos, W. Siriwan, et al. 2024. "Cassava Breeding and Cultivation Challenges in Thailand: Past, Present, and Future Perspectives." *Plants* 13, no. 14: 1899.

Kumsueb, B., J. Kitchaicharoen, A. Jintrawet, B. Limnirunkul, and Y. Kono. 2023. "Transformation Towards Organic Cassava Production in Yasothon Province, Thailand." *Current Applied Science and Technology*: 25: e0260947. https://doi.org/10.55003/cast.2024.260947.

Lai, J., J. Chen, J. Luo, et al. 2024. "Cloning and Signal Transduction of MeEIN3.1 Gene in Cassava During Post-Harvest Physiological Deterioration." *Journal of Fujian Agriculture and Forestry University (Natural Science Edition)* 53, no. 1: 7–14.

Legg, J., M. Ndalahwa, J. Yabeja, et al. 2017. "Community Phytosanitation to Manage Cassava Brown Streak Disease." *Virus Research* 241: 236–253. https://doi.org/10.1016/j.virusres.2017.04.020.

Legg, J. P., B. Owor, P. Sseruwagi, and J. Ndunguru. 2006. "Cassava Mosaic Virus Disease in East and Central Africa: Epidemiology and Management of a Regional Pandemic." *Advances in Virus Research* 67: 355–418.

Li, H., L. Liu, P. Li, et al. 2021. *Breeding of Elite New Cassava Lines and Research on Cultivation Techniques*. CNKI. https://kns.cnki.net/kcms2/article/abstract?v=YBmesx2FU7k-CtmuQqi5shG_z5nWYprp9A53-ofIzfUdXBKAu0p1txLQot4eInqvYzraBAR6CBcfBz6brOoaDozWYswyYCmTFDvvA_NTs4fJhcDYpgyZI6LQeHIGjipFnIlmxHZnMPFMqbw5Z4b0gD7oz1leNutbfOT7Hzeq2Tdjr4186CKRn0YSephJrV5X&uniplatform=NZKPT&language=CHS.

Li, J., K. Li, and Y. Tan. 2025. "Development Models, Trend and Prospects of China-Africa International Cooperation on Cassava." *China Tropical Agriculture* 2025, no. 4: 18–28.

Li, L., C. Wang, C. Li, et al. 2023. "Cloning of Cassava MeHsfB3a Gene and Identification of Its Function Against Cassava Bacterial Blight." *Chinese Journal of Tropical Crops* 44, no. 1: 9–16.

Liang, X., Z. Li, G. Li, X. Wang, L. Xu, and Y. Wei. 2024. "Research on the Experience, Challenges and Suggestions of Building an International Science and Technology Cooperation Platform of Tropical Agriculture—Take CATAS-CIAT Cooperation as an Example." *China Tropical Agriculture* 2024, no. 4: 65–71.

Lin, H., and Z. Yuan. 2025. "Successful Practice and Future Prospects for Cassava Moving Northward in China." *Chinese Journal of Tropical Agriculture* 45, no. 2: 140–145.

Lin, Q., P. Sammonds, M. Xu, Z. Zhu, and Y. Cao. 2024. "The Current Scenario of Farmland Abandonment in China: A Systematic Review." *Land* 13, no. 11: 1790.

Liu, L., J. Huang, Y. Wei, et al. 2020. "Current Situation and Development Countermeasures of Edible Cassava and Its Leisure Utilization in China." *Acta Agriculturae Jiangxi* 32, no. 5: 145–150. https://doi.org/10.19386/j.cnki.jxnyxb.2020.05.26.

Lu, L., H. Yan, S. Cao, et al. 2023. "Breeding of an Edible Cassava Variety(cv. Gui8)." *Molecular Plant Breeding*: 1–15. http://kns.cnki.net/kcms/detail/46.1068.S.20230330.1004.004.html.

Luiz, J. C., and S. Chen. 2020. "Genetic Resources, Evaluation, Application and Breeding of Cassava Crop." *Chinese Journal of Tropical Crops* 41, no. 10: 1968–1978.

Lv, D. 2019. "Screening of Cassava Salt Tolerentgermplasms & Transcriptomeanalysis of Salt-Tolerantgermplasm SC8 Salt Stress [Master's Thesis, Hainan University]." https://doi.org/10.27073/d.cnki.ghadu.2019.001006.

Ma, Q. 2022. *Development of High-Quality Stress-Resistant Cassava Germplasm and Breeding of High-Starch Varieties*. CNKI. https://kns.cnki.net/kcms2/article/abstract?v=YBmesx2FU7n8-RGuNkzWWYkBRrx3L78sESPd04ECeAbL7aBtH7o0Lkf0XOOlG-8HmQsG26XS-TxxRGrU8B5LobZIh4dJY8HIbgc6WNqTaeIxRbkM4uKbP-zxrH_tJRL0-e0I2HlANuB2fS7rhtIl8GieG3X9eTvK0cSA7MD08sNKstaC8Y6MHNvEiF4RFXSA&uniplatform=NZKPT&language=CHS.

Malik, A. I., P. Kongsil, V. A. Nguyễn, et al. 2020. "Cassava Breeding and Agronomy in Asia: 50 Years of History and Future Directions." *Breeding Science* 70, no. 2: 145–166.

Mbanjo, E. G. N., I. Y. Rabbi, M. E. Ferguson, et al. 2021. "Technological Innovations for Improving Cassava Production in Sub-Saharan Africa." *Frontiers in Genetics* 11: 623736.

Montagnac, J. A., C. R. Davis, and S. A. Tanumihardjo. 2009. "Nutritional Value of Cassava for Use as a Staple Food and Recent Advances for Improvement." *Comprehensive Reviews in Food Science and Food Safety* 8, no. 3: 181–194.

Moreno-Cadena, P., G. Hoogenboom, J. H. Cock, et al. 2021. "Modeling Growth, Development and Yield of Cassava: A Review." *Field Crops Research* 267: 108140.

Mulenga, R. M., L. M. Boykin, P. C. Chikoti, S. Sichilima, D. Ng'Uni, and O. J. Alabi. 2018. "Cassava Brown Streak Disease and Ugandan Cassava Brown Streak Virus Reported for the First Time in Zambia." *Plant Disease* 102, no. 7: 1410–1418. https://doi.org/10.1094/PDIS-11-17-1707-RE.

Narayanan, N., G. Beyene, R. D. Chauhan, M. A. Grusak, and N. J. Taylor. 2021. "Stacking Disease Resistance and Mineral Biofortification in Cassava Varieties to Enhance Yields and Consumer Health." *Plant Biotechnology Journal* 19, no. 4: 844–854. https://doi.org/10.1111/pbi.13511.

Ndudi, W., G. I. Edo, P. O. Samuel, et al. 2024. "Traditional Fermented Foods of Nigeria: Microbiological Safety and Health Benefits." *Journal of Food Measurement and Characterization* 18, no. 6: 4246–4271.

Ocampo, J., T. Ovalle, R. Labarta, et al. 2021. "DNA Fingerprinting Reveals Varietal Composition of Vietnamese Cassava Germplasm (*Manihot Esculenta* Crantz) From Farmers' Field and Genebank Collections." *Plant Molecular Biology* 109: 215–232. https://doi.org/10.1007/s11103-021-01124-0.

Ogbonna, A. C., L. R. Braatz de Andrade, L. A. Mueller, E. J. de Oliveira, and G. J. Bauchet. 2021. "Comprehensive Genotyping of a Brazilian Cassava (*Manihot esculenta* Crantz) Germplasm Bank: Insights Into Diversification and Domestication." *Theoretical and Applied Genetics* 134: 1343–1362. https://doi.org/10.1007/s00122-021-03775-5.

Ospina, J. A., D. Lopez-Alvarez, W. Gimode, P. Wenzl, and M. Carvajal-Yepes. 2024. "Genome-Wide Association Study of Cassava Brown Streak Disease Resistance in Cassava Germplasm Conserved in South America." *Scientific Reports* 14, no. 1: 23141. https://doi.org/10.7910/DVN/H4PDE5.

Otun, S., A. Escrich, I. Achilonu, et al. 2023. "The Future of Cassava in the Era of Biotechnology in Southern Africa." *Critical Reviews in Biotechnology* 43, no. 4: 594–612.

Ou, W., Z. Wei, H. Liang, X. Xia, and K. Li. 2016. "Promoting China-Africa Cassava Technology Cooperation to Serve the National 'Belt and Road' Initiative." *China Tropical Agriculture* 2016, no. 4: 9–12.

Parmar, A., B. Sturm, and O. Hensel. 2017. "Crops That Feed the World: Production and Improvement of Cassava for Food, Feed, and Industrial Uses." *Food Security* 9: 907–927.

Patil, B. L., J. P. Legg, E. Kanju, and C. M. Fauquet. 2015. "Cassava Brown Streak Disease: A Threat to Food Security in Africa." *Journal of General Virology* 96, no. 5: 956–968.

Rangsarannon, W. 2018. A Study on Measures to Improve Export Competitiveness of Thai Cassava. [Master's Thesis, Dalian Maritime University]. https://kns.cnki.net/kcms2/article/abstract?v=d24vdHNzaZgh3HBWvzCwWiGuDIL035EhvhTCvW48Onvh1X78eoPKnZDkffRlN8iv-cza4e-AwRqxnY62mai14nkAWnX4yEUmDPoq6ZrYBq0GhAJ5mUq88VzrFQ3TiXMM2w7XzHM1ks4Lq1QbNd9dv734ZyXMG6FN3NcZUlvrAEKWaUnyIgsP_4NuYLWbdHaNhyFqE4v-gEk=&uniplatform=NZKPT&language=CHS.

Robson, F., D. L. Hird, and E. Boa. 2024. "Cassava Brown Streak: A Deadly Virus on the Move." *Plant Pathology* 73, no. 2: 221–241. https://doi.org/10.1111/ppa.13807.

Sakadzo, N., A. T. Kugedera, N. Ranganai, and L. K. Kokerai. 2025. "Cassava: Practices and Technologies to Improve Food Security in Sub-Saharan Africa." *Cogent Food & Agriculture* 11, no. 1: 2518758.

Sam, W., O. S. Morris, O. Tom, O. Patrick, J. Colvin, and O. C. Abu. 2024. "Resistance to Cassava Whitefly (*Bemisia Tabaci*) Among Eastern and Southern African Elite Cassava Genotypes." *Insects* 15, no. 4: 258. https://doi.org/10.3390/insects15040258.

Shen, J., S. Dong, S. Li, and M. Peng. 2021. "Identification of lncRNA-CRR5 in Response to Low Temperature Stress in Cassava." *Chinese Journal of Tropical Crops* 42, no. 1: 40–46.

Shi, T., C. Li, G. Wang, and G. Huang. 2023. "Research Review, Current Progress and Future Outlook on Cassava Diseases in China." *Chinese Journal of Tropical Crops* 54, no. 12: 2355–2368.

Shittu, T. A., B. A. Alimi, B. Wahab, L. O. Sanni, and A. B. Abass. 2016. *Cassava Flour and Starch: Processing Technology and Utilization*, 415–450. Tropical Roots and Tubers: Production, Processing and Technology.

Sirikul, C. 2015. Competitiveness of Thai Cassava and Its Products in the International Market [Master's thesis, East China Normal University]. https://kns.cnki.net/kcms2/article/abstract?v=Hk3u3f8a_Qu3BUYguK-Qa5ngU5ZPzGqBB3saX0RcXpM2Mx_2n_lcd4K24ZJOiS27185WY0_kLaM8T1QWlwuJFJEX-DHWHjUCrr_JwERJwaKO2tO-eX2P0QPvwWDyngdH_oGGt-T3DpK93GYmofGAn2C3i41C_UqwmVLn7U76_tcMlvA-D9DsXluSTangF6pQzMTBeAAOzCc=&uniplatform=NZKPT&language=CHS.

Su, B., J. Wang, J. Huang, et al. 2019. "Storage Root Configuration of Cassava and the Influence for Mechanical Harvesting." *Chinese Journal of Tropical Crops* 40, no. 10: 2029–2033.

The Hindu Bureau. 2024. *Central Tuber Crops Research Institute Releases Drought-Tolerant Tapioca Variety*. Hindu. https://www.thehindu.com/news/national/kerala/central-tuber-crops-research-institute-releases-drought-tolerant-tapioca-variety/article68145618.ece.

Tize, I., A. K. Fotso, E. N. Nukenine, et al. 2021. "New Cassava Germplasm for Food and Nutritional Security in Central Africa." *Scientific Reports* 11, no. 1: 7394.

Uchechukwu-Agua, A. D., O. J. Caleb, and U. L. Opara. 2015. "Postharvest Handling and Storage of Fresh Cassava Root and Products: A Review." *Food and Bioprocess Technology* 8: 729–748.

Uke, A., H. Tokunaga, Y. Utsumi, et al. 2022. "Cassava Mosaic Disease and Its Management in Southeast Asia." *Plant Molecular Biology* 109: 1–311. https://doi.org/10.1007/s11103-021-01168-2.

Vilpoux, O. F., D. D. O. Guilherme, and M. P. Cereda. 2017. *Cassava Cultivation in Latin America*, 149–174. Burleigh Dodds Science Publishing.

Visalakshi, C., M. N. Sheela, V. Ravi, J. Sreekumar, and S. A. Sankar. 2023. "Varietal Screening for Identification of Postharvest Physiological Deterioration Tolerance in Storage Roots of Cassava." *International Journal of Vegetable Science* 29, no. 5: 403–414. https://doi.org/10.1080/19315260.2023.2238288.

Wagaba, H., P. Kuria, P. Wangari, et al. 2021. "Comparative Compositional Analysis of Cassava Brown Streak Disease Resistant 4046 Cassava and Its Non-Transgenic Parental Cultivar." *GM Crops & Food* 12, no. 1: 158–169.

Wang, X., and M. Wei. 2023. "A Review of the Current Development Status of the Cassava Industry in Laos." *Journal of Smart Agriculture* 3, no. 8: 63–67. https://doi.org/10.20028/j.zhnydk.2023.08.013.

Weerasak, M. 2021. The Research on the Export Competitiveness of Thai Cassava Based on the China's Market. [Master's Thesis, Guizhou University]. https://link.cnki.net/doi/10.27047/d.cnki.ggudu.2021.000639.

Wei, Y., X. Wang, L. Liu, et al. 2021. "Status of Cassava Field Fertility in Southern China." *Chinese Journal of Tropical Agriculture* 41, no. 4: 36–42.

Wu, M., X. Liang, Q. Chen, et al. 2022. "Resistance Mechanism of Cassava Cultivars to Tetranychus Urticae Based on Gene Expression Characteristics of Cyanogenic Glycoside Degradation Pathway." *Chinese Journal of Tropical Crops* 43, no. 4: 853–861.

Xiao, L., D. Cheng, W. Ou, et al. 2025. "Advancements and Strategies of Genetic Improvement in Cassava (*Manihot esculenta* Crantz): From Conventional to Genomic Approaches." *Horticulture Research* 12, no. 3: uhae341.

Xie, X., L. Lu, W. Zeng, D. Lai, and H. Yan. 2017. "Identification, Evaluation and Genetic Diversity Analysis of 31 Cassava Germplasm Resources." *Journal of Southern Agriculture* 48, no. 3: 393–400.

Xu, D., X. Deng, S. Guo, and S. Liu. 2019. "Labor Migration and Farmland Abandonment in Rural China: Empirical Results and Policy Implications." *Journal of Environmental Management* 232: 738–750.

Xu, F., X. Zhao, F. Sun, H. Yan, X. Chen, and W. Wang. 2023. "Screen New Edible Cassava Lines Assisted by Molecular Markers of Key Traits." *Chinese Journal of Tropical Crops* 44, no. 12: 2401–2408.

Xu, L., L. Li, L. Yu, and F. Wei. 2018. "Crop Germplasm Resources: Advances and Trends." *Journal of Agriculture* 8, no. 1: 10.

Xue, M., W. Zhu, K. Li, and S. Chen. 2015. "Screening Cassava Varieties With Resistance to Cassava Mosaic Disease in Congo (Brazzavill)." *Chinese Journal of Tropical Crops* 36, no. 10: 1779–1784.

Yuanjit, P., S. Vuttipongchaikij, P. Wonnapinij, et al. 2023. "Evaluation of Yield Potential and Combining Ability in Thai Elite Cassava Varieties for Breeding Selection." *Agronomy* 13, no. 6: 1546. https://doi.org/10.3390/agronomy13061546.

Zhang, J. 2011. "A Preliminary Discussion on History of Cassava's Development." *Agricultural History of China* 30, no. 2: 19–30.

Zhang, N. N., S. Yang, Y. Y. Kuang, C. S. Shan, Q. Q. Lu, and Z. G. Chen. 2022. "Effects of Different Modified Starches and Gums on the Physicochemical, Functional, and Microstructural Properties of Tapioca Pearls." *International Journal of Biological Macromolecules* 206: 222–231.

Zhang, Z., K. Li, Y. Chen, Y. Zhang, X. Zhang, and M. Geng. 2022. "Cloning of Cassava MeSAP13 Gene and Identification of Its Function Against Cassava Bacterial Blight." *Chinese Journal of Tropical Crops* 43, no. 10: 1981–1988.

Zhao, Y., Y. Luo, M. Zhang, et al. 2023. "Breeding of New Cassva Variety GR12 and Its Cultivation Techniques." *Molecular Plant Breeding* 23, no: 12: 4024–4032. http://kns.cnki.net/kcms/detail/46.1068.S.20230712.2104.013.html.

（5）高价值专利指标探讨--基于中国金奖专利的实证分析 (C 类)



全国中文核心期刊

中国人文社科（AMI）核心期刊

RCCSE 中国核心学术期刊



CHINESE UNIVERSITY SCIENCE & TECHNOLOGY

主　管	中华人民共和国教育部
主　办	教育部科技发展中心
编辑出版	《中国高校科技》杂志社
总编辑	张拥军（兼）
社　长	刘　燕
执行总编	刘　燕（兼）
法律顾问	北京市华泰律师事务所
编辑部	薛　娇（主任）　陈文华　高春燕
	赵彦文（美术编辑）
终　审	刘　燕
终　校	马胜利
运营部	方文梅　张艳辉　张靖怡

中国学术期刊综合评价数据库
（CNKI）全文收录

地 址 北京海淀区中关村大街
35 号 1103 室
邮 编 100080

编辑部 (010) 62510225
(010) 62511446
运营部 (010) 62510207
传 真 (010) 62510207
E-mail zgqxkj@126.com

在线投稿网址 http://zgkc.cbpt.cnki.net
国内统一刊号 CN 10-1017/N
国际标准刊号 ISSN 2095-2333
邮发代号 82-842
国内总发行 北京市报刊发行局
国外发行代号 4828M
海外总发行 中国国际图书贸易集团有限公司
广告经营许可证 京海市监广登字 20210013 号

出版日期 每月 20 日出版
定价 人民币 20 元
印制 廊坊市文峰档案印务有限公司

中国高校科技

目 录

科研管理

基于自然指数的高校学科领域贡献度研究 王纬超 戴 倩等 04
区域学科协同发展路径发现框架的探讨
——基于“学科－方向－团队”对江西省分析视角为例 张发亮 10
高校科技创新人才激励管理的探求
——以组织核心战略为视角 王 炜 王学慧等 16
高校大型仪器共享平台高质量发展的思考
——基于资源配置机制及运行效益提升的改革对策 严丽娟 陈永清等 22

评价与发展

科技成果转化中试基地绩效评价指标体系构建 李丽红 郭珍旭等 26
高校教师评价指标体系的改进思考
——以国际视野下的全周期为视角 杨华春 任 南等 30
高校科技人才评价改革的困境与应对策略
——基于评价指标重构的视角 邢欣欣 36

创新体系建设

协同创新视域下我国智库创新运行机制研究 宋姗姗 王金平等 40
高校教研项目的众包模式探索
——以产学研“3D 资源库”项目为例 付高财 盛步云等 45

国际视野

行业高校跻身世界一流大学的战略推进研究
——以瑞典农业科学大学目标规划的理念为例 王方洲 吴 平 49
高校参与中小学科技教育的启示
——以新西兰 3 所院校的长期科技教育项目为例 王俊民 55

科研育人

基于 SEM 的研究生创新能力影响研究
——以 A 校研究生院为例 肖 阳 温 洋等 60

CHINESE UNIVERSITY SCIENCE & TECHNOLOGY

2021 年第 08 期 （总第 396 期）

官方微信

全国中文核心期刊

中国人文社科（AMI）核心期刊

产学研用

关系契约视域下校企合作运行逻辑解构与建构　郝少菲　何云峰等　66

应用型本科院校产教融合发展的路径选择

——基于 OBE 理念　李　磊　70

知识产权

德国高校知识产权政策的路径及启示　赵　丰　75

高价值专利指标探讨

——基于中国金奖专利的实证分析　刘　洋　80

转化与服务

新时期高校科技成果权属与处置相关问题探讨　顾志恒　王　玲　85

高校哲学社会科学期刊参与哲学社会科学成果转化的有效途径

——基于区域经济社会发展视角　马晓宁　90

高校科技成果转化“三定向”导向的探究

——以沈阳化工大学为例　聂　鑫　孟召宾　93

声 明：本刊已许可合作单位以数字化方式复制、汇编、发行、信息网络传播本刊全文，相关著作权使用费与本刊稿酬一次性给付。如作者不同意文章收录，请在来稿时向本刊声明，本刊将做适当处理。

书评·广告

人力资源管理对高校绩效的影响研究　贾　羽

多元交互式教学评价体系的构建　鲁燕飞

新时期高校数字媒体教育研究　陈　曦等

大数据背景下高校教育信息化创新与建设　陆周浩

“互联网 +”背景下大学生创新创业能力培养　段　梦

多模态视域下思政课程改革思考　邹有峰

课程思政理念下专业英语教学改革研究　王　岚

文化自信背景下英语教学多维路径选择　巫宜霖

跨文化教育视角下的中国英语教育　祁　璐

俄语专业应用化教学体系研究　何旭红

中国传统文化与对外汉语教学结合之探　潘乐英

素质教育背景下教学管理制度改革探讨　王庭良

高校环境艺术设计实践教学的探索　陈　阳

高校体育情景融合教学模式创新研究　徐成波

21 世纪大学体育教育趋势及重心　廖永超

美声唱法发展现状与教学策略　黄媛媛

现代技术背景下的高校音乐教学创新　李　寒

音乐教学法理论在当代学校教育中的应用　石　宁

多元文化对音乐教育核心课程构建的呼唤　刘　洋

高价值专利指标探讨

——基于中国金奖专利的实证分析

刘　洋[1,2]

（1 华南农业大学 图书馆，广东　广州　510642；2 华南农业大学 知识产权信息服务中心，广东　广州　510642）

摘　要：高价值专利在支撑产业创新发展中发挥着重要的引领作用，不仅是创新技术的重要标志，更能带动制度、管理等方面的创新。文章在知识产权强国战略背景下，以提升专利质量为目标，构建以技术、法律、市场、战略和经济价值五维度体系，通过12个指标，细化维度体系，利用人工分析法与DPI专利估值模型，提炼金奖专利主要特征，为挖掘培养高价值专利提供指标参考。

关键词：中国专利金奖　高价值专利　五维度　基础指标

DOI:10.16209/j.cnki.cust.2021.08.016

在大力实施创新驱动发展战略，推动科技成果转移转化的背景下，提升专利质量，促进知识产权的价值实现，努力发展高价值专利，是支撑中国创新发展的重要举措。高价值专利在支撑产业创新发展中发挥着重要的引领作用，其不仅是创新技术的重要标志，更能带动制度、管理等方面的创新。因此，只有努力培育高价值专利，才能为创新驱动发展提供助力，筑牢强国建设根基。目前，高价值专利的评判主要有两种方式。定性角度认为：具有一定的技术含量，较高的文本质量，较高的权利稳定性，市场应用前景好，产品市场占有率高，当前或未来市场控制力和竞争力强的专利就可视为高价值专利；定量角度，则集中探讨如何量化高价值专利的具体指标与核心指标及阀值。获得中国专利金奖的专利通常也是高价值专利的代表，目前仅金奖专利等少数专利奖公开了评审的维度。其评价指标及权重包括：专利质量（25%）、技术先进性（25%）、运用及保护措施和成效（35%）、社会效益及发展前景（15%）。因此，本文以金奖专利为样本进行实证分析，挖掘金奖专利的指标特征，从而为高价值专利的遴选及培育提供指导。

目前，国外对于专利价值的评估多关注专利与市场价值的关联度以及专利状态对于公司表现的影响，对于高价值专利判定以及专利各项指标的认定研究较少。中国作为专利申请数量大国，如何实现从数量到质量的提升，专利的筛选研究显得更迫切。国内对于高价值专利的定义目前没有统一的核心指标及阀值，学者的研究多集中于专利权人类型以及专利本身各项指标的表现情况。对于专利与市场结合研究较少，专利指标的选择通常只有4—9个，并不能完全解释专利价值情况。本文将结合市场情况，建立五个维度的评价体系，将专利价值评价指标扩充至12项，以金奖专利作为分析样本，提炼金奖专利的主要特征，将市场与经济因素与专利自身情况充分结合，为高价值专利筛选提供维度和指标参考。

一、数据来源及研究方法

（1）数据来源。本文通过国家知识产权局网站中国专利奖专栏，整理出1989—2018年共20届320件金奖专利，利用大为Innojoy专利数据库和Incop数据库，对所选样本进行检索录入。数据清洗主要包括专利号的核准与法律状态的确认。由于中国专利号码制度的修改，早期金奖专利公开号与目前通用规则存在较大差异，第1至7届获奖专利的专利号缺失。因此，通过人工核定，补全缺失数据。此外，在过往分析中，无效专利并不纳入分析中，为了更好地总结金奖专利的特征值，本文将失效专利（未交年费终止或专利权届满）也纳入了分析对象，保证分析数据的科学性、完整性。

（2）研究方法。由于发明专利的保护年限只有20年，320件金奖专利中已有126件、近40%的专利失效。失效专利的法律价值与市场价值明显处于劣势，但在技术价值方面仍有一定的借鉴意义。单一的系统分析法（DPI）无法考量实际情况。为了全面客观的分析中国的金奖专利，本文将采用人工评价与系统评价法相结合的方式，构建五维度

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

评价体系即从技术价值、法律价值、市场价值、战略价值和经济价值维度，对金奖专利进行评估。在维度细化方面，由于有效专利与失效专利在分属维度中的侧重不同，单一模型评分，会造成失效专利部分维度分值为 0，不能客观的呈现专利特征。因此，在维度细分中，采用人工评价对 320 件专利进行 12 个指标的细分评价；对于有效专利进行二次分析，利用系统分析法中的 DPI 模型全面分析其市场、经济维度等。本文主要利用大为 Innojoy 做数据检索统计和 DPI 分析，综合人工评价，最终得出 320 件金奖专利的特征（图 1）。

二、中国金奖专利描述性统计分析

（1）专利申请人分析。据统计，320 件金奖专利申请人中，企业为第一权利人的 184 件，占 57.5%。其中，世界 500 强企业有 65 件，中国石油化工集团公司 18 件，中兴 7 件，华为 7 件。高校排名第二位，共 60 件，占 18.75%；其中，清华大学 12 件。研究院所排第三位，共 49 件，占 15.31%；个人排第四位，共 27 件，占 8.43%。可以看出，企业不仅是我国专利申请的主力军，也是金奖专利获奖的主要群体，强企依托产业创新申请的专利，在生产中更易形成成果转换，因此，获得金奖的件数明显多于高校及科研院所。高校和科研院所获奖专利数量虽没有企业多，但在个别领域仍掌握待转化的核心技术，值得关注。

（2）专利申请人地域分析。在地域分布上，北京、广东、山东、上海、江苏获奖专利排名居前 5 位。这与王向红在中国专利奖获奖专利分析中，“广东、北京、江苏、山东和浙江获奖专利数量位列前五”的分析基本相符。经济发达的沿海省份获奖专利普遍较多，部分省份甚至没有金奖专利，经济发展带动创新，创新驱动经济发展。地域的获奖专利分布，反映了经济与科技发展程度，通常一个地区的经济发展水平与知识产权水平具有较高的一致性，二者互相促进。

（3）金奖专利聚类分析。320 项专利金奖中，有 5 项是外观设计，外观设计没有分类号，暂不纳入分析。315 项中共分八个大部，分别为：A 部 31 项；B 部 39 项；C 部 98 项 ；D 部 9 项；E 部 11 项；F 部 20 项；G 部 39 项；H 部 68 项（表 1）。由表 1 可以看出，315 件金奖专利热点类数量排序为：C 部 >H 部 > B 部 = G 部 > A 部 > F 部 > E 部 > D 部。在获奖专利领域分布中，C 部即化学、冶金领域的获奖专利最多，其次为 H 部电学，B 部作业运输和 G 部的物理获奖专利占比均为 12%。可以看出，获奖

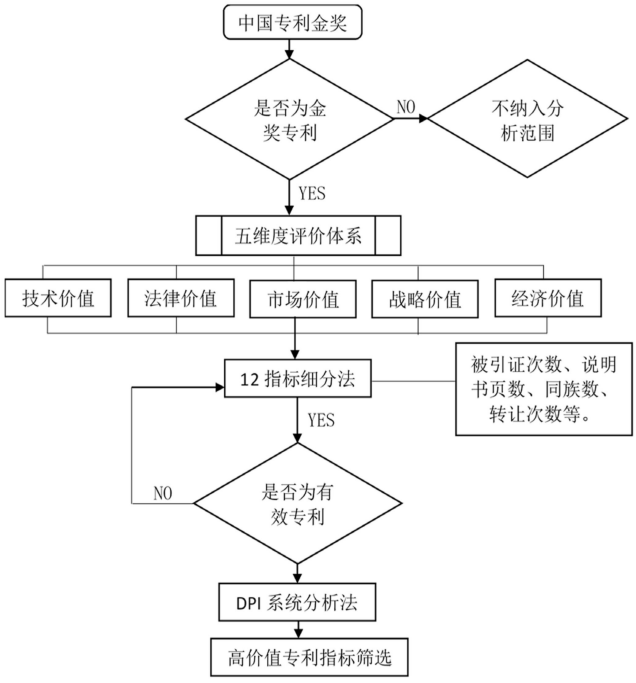


图 1　研究路线图

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

专利集中于工业的技术升级领域多，电子通讯等产业的快速迭代也使得 H 部专利质量得到提升认可。为更好地分析获奖专利的具体领域，将大部细分看大类，可以看到，前 5 类分别为 H04 电通讯技术、A61 医学或兽医学、H01 基本电器元件、C07 有机化学、G01 测量。广东省在 H04 电子通讯领域的获奖专利最多；北京金奖专利集中在 B01 一般的物理或化学的方法或装置以及 G01 测量领域，这是地方经济发展特点的体现。金奖专利申请涵盖了七大战略新兴领域的节能环保、新兴信息产业、生物产业、高端装备制造业和新材料领域，也是目前我国重点发展和扶持的产业，这些产业的发展，进一步推动了相关技术的发展和知识产权的布局。

表 1　金奖专利大部分类

	A 部	B 部	C 部	D 部	E 部	F 部	G 部	H 部
个数	31	39	98	9	11	20	39	68
占比	10%	12%	31%	3%	4%	6%	12%	22%

（4）金奖专利法律状态及运营情况分析。据统计，在 320 件获得专利金奖的专利中，有效专利 194 件，由于保护时间的限制，前 8 届专利都处于失效状态。在届满终止与未缴费年费终止的比例中，前 5 届未缴年费终止的专利明显多于届满终止的专利。但之后维持届满终止的专利数量增多，说明金奖专利在质量和市场价值上面得到认可，维持比例上升，专利权人开始重视专利维持。在运营方面，共 115 件金奖专利进行许可、转让或质押的经济行为，专利实施率为 35%。

三、五维度的实证分析

（1）指标建立。以往文献中对高价值专利的分析多集中于专利自身情况，与外界如市场、战略和经济因素结合分析较少。为了更加全面反映专利的价值，提取金奖专利的特征。本文采用五维度分析法，五个维度包括：技术价值、法律价值、市场价值、战略价值和经济价值，通过人工分析与系统分析相结合的方式，将五维度细分 12 个指标，同时对仍处于有效状态的专利，增加 DPI 的星级评分指标检测，以此将专利自身指标与外界因素相结合，分析金奖专利特征（图 2）。

（2）人工分析。第一，技术价值维度。技术价值体现了获奖专利所处领域的技术先进程度，主要指标包括专利的被引证次数和引证次数。

指标 1：被引证次数，被引证次数包括被引证次数和同族被引证次数。指的是专利在授权后，被后续专利引用的次数，通常认为专利被引证数越高，说明该专利受到的关注度越高，质量可能会越高。320 件金奖专利，平均被引 6.64 次，最高被引 44 次，平均被引次数是我国专利平均被引次数的 3 倍，说明金奖专利关注度比较高，一定程度反应出金奖专利的质量较好。

指标 2：引证数，引证数是专利文献参考和引用其他文献（专利）的数量，一定程度上反应了专利技术的引领性。320 件金奖专利中，平均引证约为 1.30 次，最大引证 19 次，引证次数较少。一方面，由于早期专利撰写获取的信息渠道专利查询有限，导致引证次数偏少；另一方面，金奖专利的创造性高，在所属领域具有一定的开创性，因此对前引专利利用较少，侧面反映金奖专利具有较高的创新性。

第二，法律价值维度。体现专利法律价值维度的指标比较多，我们选取了专利文献的说明书页数、权利要求项数、PCT 国际申请和专利的存活期指标进行分析。

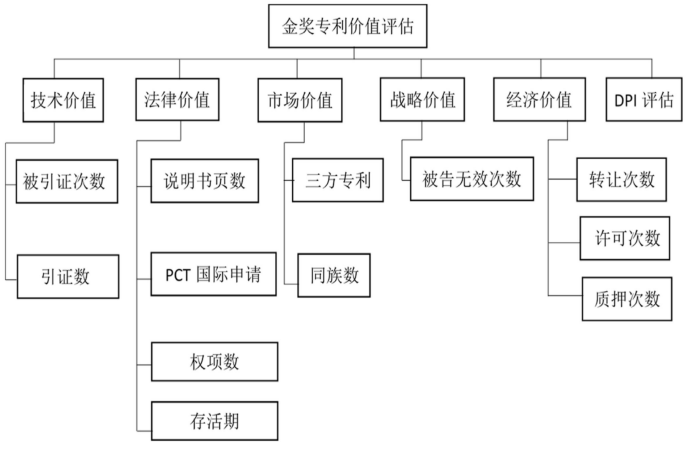


图 2　五维度 12 指标细分图

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

指标 3：说明书页数，说明书的页数一定程度上可反映专利撰写的质量，说明书页数越多，表明技术越复杂，模仿难度越高，技术方案公开越充分，专利质量相对越高。320 件金奖专利，平均页数 14.23 页，最高页数 154 页，中位数落在 11-15 页之间。通过查阅原始数据，早期专利说明书页数较少，随着时间的推移，说明书页数不断增加。由于金奖专利来自于不同领域，领域间的差异也导致了申请书页数的悬殊过大，说明金奖专利技术研发不断提高，技术方法阐述越详细，后期保护越有针对性。

指标 4：PCT 国际申请，PCT 是专利合作条约，其核心是成员国在该条约内用一种文字向一国提交专利申请后，经过检索及审查后，可以在多国申请审查和授权。目前，PCT 申请的数量也成为了衡量专利向国外申请和布局的一项指标。320 件金奖专利中 61 件申请了 PCT 专利，占比为 19%，说明金奖专利在专利布局中，不但重视国内的市场保护，同样也在世界范围内进行技术的布局。对其自身创新性的认可，使得自身权利保护与市场开拓意识增强。早期金奖专利对 PCT 申请不多，这是由于中国专利奖设立初期，我国知识产权创造和申请水平以及知识产权国际布局的战略意识都不到位，参与国际技术竞争能力不足。但在 2009 年后金奖中陆续出现 PCT 申请，也印证了中国近年来技术的高速发展。

指标 5：权项数分析，专利的权利要求项用以限定专利保护的范围，也是专利侵权纠纷的判定依据。一般来说，权利要求项数越多，说明专利的技术方案越具体，专利技术的可实施性和可操作性越强，相对而言，专利权也更稳定，专利的技术价值和法律价值更高。320 件金奖专利中平均权项数 9 个，最高的是 77 项，权利要求项数并不多。国外申请人来华申请专利的权利要求书项数普遍较多，作为中国专利金奖的专利，其权利要求书的项数应该不低于国外来华申请专利的权项数，说明我国专利的权利要求书项数有较大的提升空间。

指标 6：存活期分析，专利存活期也称专利寿命，是授权专利从申请日到无效、终止或届满日之间的时间。专利权人对专利维持时间的长短，间接反映了其对专利价值的认同程度。一般讲，专利权维持时间（存活期）越长，专利权越稳定，说明该专利的实用性及战略价值高，具有较高的专利价值。在 320 件金奖专利中有 64 件为届满终止，占金奖专利的 1/5；62 项为未缴年费终止。目前，存活的 194 件中平均存活期为 12 年，最短的为 4 年，最长为 20 年。通过数据分析发现，在设立专利奖 30 年的时期内，有 1/5 的金奖专利是届满终止，说明专利权人对金奖专利的维持程度较高；在 194 件存活的专利中，平均存活期为 12 年，平均存活期占专利生命期的 2/3，基本符合技术生命周期理论。

第三，市场价值维度。

指标 7：三方专利（美日欧），三方专利是指在美国、日本和欧洲专利局三方都提出了专利申请寻求保护，并至少在美国专利商标局获得发明专利权的同一项专利，一般认为这个指标能很好地反映国外对中国专利的认可，反映专利创新水平和科技实力。2005 年，金奖专利中开始有三方专利（美、日、欧），320 件金奖专利中有三方专利的 33 件，占比为 10.31%，近 15 年三方专利增速上升，美、日、欧作为发达国家和地区，其科技实力、市场环境和知识产权保护水平都高，在这些国家和地区申请专利保护、布局知识产权并得到授权，一方面体现了我国产品、服务和技术走出去的意识和战略眼光，另一方面也说明技术先进，不光在国内，在国际上也走到了前列，得到国际认可，体现专利价值。

指标 8：同族数，同族专利是指基于同等优先权文件，在不同国家或地区，以及地区间专利组织多次申请、多次公布或批准的内容相同或基本相同的一组专利文献。有同族专利，意味着这项技术创新在国内外均通过审查获得专利授权，专利后期有所调整改进。同时，也说明该技术已形成了系统的专利保护网络体系。在金奖专利中平均同族数为 3.64，最多同族数为 50 个，最少为 1 个，金奖专利中的同族数并不多。说明专利初期申请已比较到位，技术后续改善较少，具有一定的开创性和可持续性。

第四，战略价值维度。

指标 9：被告无效次数，专利被提无效诉讼也是一个来判断专利价值的指标，通常情况下，认为专利被提无效的次数越多触碰他人利益的机会越多、被关注的程度越高，价值也越大。如果利益相关方提起无效宣告请求，说明相关专利对其构成了较大的威胁；如果经历无效程序之后专利权仍然稳定留存，则说明该专利具备较高的价值。在金奖专利中有 25 件专利被无效 40 次，平均 1 件专利被无效 1.6 次，但所有被告无效的专利最终仍维持有效。同时，在查阅原始数据发现，金奖专利的诉讼更多的是维权诉讼，较少涉及侵权诉讼。说明金奖专利的权利要求和技术创造性更具说服力。

第五，经济价值维度。经济价值是高价值专利的重要指标，经济价值是专利被制造或销售后产生的利润或增加值，或专利在许可、转让时产生的许可转让费，或专利在以资产入股时获得的股份收益等。因此，本文选择转让次数、许可次数、质押次数三个指标反映金奖专利的经济价值。

指标 10：转让次数，专利转让证明了专利在权利人之间的流转，能够产生交易流转的往往说明了专利本身较有

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

市场前景，有投入实施的可行性，因此，有条件的企业通过购买专利的形式，获得最新技术，以节约研发成本。在金奖专利中有 76 件专利实施了转让，共转让 95 次，占金奖专利的 23.75%，而根据《2018 年中国专利调查报告》显示，2018 年我国总体专利转让率为 3.1%。从专利权人类型来看，个人的有效专利转让率为 3.7%，企业的转让率略高于全国为 3.2%，高校的有效专利转让率为 1.4%，科研单位的有效专利转让率为 1.5%。由此对比不难看出，金奖专利的转让率明显高于全国平均水平，甚至超出高校和科研院所转让率的十倍之多。说明金奖专利的运营情况良好，得到相关受让人的关注和投资，专利转换能力强。

指标 11：许可次数，金奖专利的专利权人主体有相当一部分为高校和科研院所，受职务发明的影响，高校和科研院所的专利在实施转化的过程中，通常采用实施许可的方式进行。金奖专利中有专利实施许可的 36 件共许可 63 次，占金奖专利的 11.25%。2018 年，我国专利许可率为 5.5%。从专利权人类型来看，高校的许可率为 1.8%。企业的专利许可率为 6.1%，甚至高于较容易实现的外观设计许可率近 5 个百分点。可见，金奖专利不但转让次数高于全国，许可率也明显走在全国平均水平之上。

指标 12：质押次数，专利质押是近年兴起的一种新融资手段，成功质押的专利能缓解质押人暂时的经济压力，融资的额度高低，也是对专利价值的量化评估。金奖专利中，共有 13 件专利实施了质押，占比为 4%。质押率不高，一方面是因为专利质押的实施是近年来开展的专利运营新业务，模式与细则都在探讨和摸索中，因此较早期专利并不涉及这一方面；另一方面，金奖专利的专利权人大部分是实力较强的企业或者以非营利为目的的科研院所，其运营资金有其他方式获得，而专利质押也存在融资时间短，融资渠道窄的缺点，因此并非其首选方式，所以质押率较低。

（3）系统 DPI 质量量化评估。为了更好的挖掘有效金奖专利的特征，本文对 194 件有效金奖专利除了做五维度分析外，增加了 DPI 的专利价值估值模型分析。此部分主要是通过 Innojoy 的 DPI 专利质量指数获得，其主要在五维度的基础中，增加相关指标，建立质量量化评估模型，评估结果以分值、星级可视化方式展示。在 194 件有效金奖专利中，有 139 件在是 5 星级以上，占比为 72%，H 部电学最多为 41 件。在对有效金奖专利进行打分时，H 部电学和 E 部固定建筑物的评分较高，而总体有效金奖专利的均评分在 90 分以上，说明金奖有效专利价值较高，符合预期。

四、结论及思考

通过人工分析法与 DPI 专利估值模型，对金奖专利展开五维度 12 指标及阀值分析，得到中国金奖专利在市场价值、战略价值和经济价值维度的表现比较突出。特别在转化率上明显高于普通专利，在技术价值方面，专利的被引证次数也十分突出；法律价值方面，专利存活期较长，专利维持较好；但是在权利要求项数和 PCT 申请件数方面，与普通专利区别不明显。有效专利的 DPI 分值（90 分）普遍较高，说明现行有效专利的质量高，专利表现良好。因此，未来对高价值专利挖掘培育时，可以根据实际筛选的侧重维度，围绕维度指标及阀值入手，进一步完善创造、申请、审查、保护和管理等各环节，提高质量和效率确保产出高价值专利。金奖专利的运营效率反映了其价值的高度，对于普通专利提升质量转化成高价值专利，通过开发应用或资本运营手段更有效能发挥其作用。专利权人、发明人、应用企业、相关运营者和中介机构，要利用好国家当前实施创新驱动发展战略，利用国家鼓励科技成果转化的放权、让利、减税和支持创新创业等有利政策，加大高价值专利的开发应用力度，通过自行转化、专利权转让、实施许可、作价入股投资、质押融资等途径，充分挖掘利用高价值专利资产，使其发挥更大效益。

作者简介：刘洋，华南农业大学图书馆馆员，主要从事专利文献分析、专利情报分析研究。

[基金项目：广东省质量监督管理局定向委托建设项目“广东省高校知识产权信息服务中心建设”（6200/F19121）]

主要参考文献：

[1] 新华社 . 中共中央办公厅 国务院办公厅印发《关于强化知识产权保护的意见 [EB/OL].(2019-11-24) [2019-12-15].http://www.gov.cn/xinwen/2019-11/24/content_5455070.htm.

[2] 李顺德 . 努力培育高价值专利正当时 [EB/OL].(2017-06-30) [2019-08-13]. http://www.sipo.gov.cn/ztzl/jjgjzzl/gjzzldjt/1080068.htm.

[3] 国家知识产权局办公室 . 关于印发《中国专利奖评奖办法》(2018) 的通知 [EB/OL].(2018-06-11)[2019-03-10].http://www.sipo.gov.cn/gztz/1125260.htm.

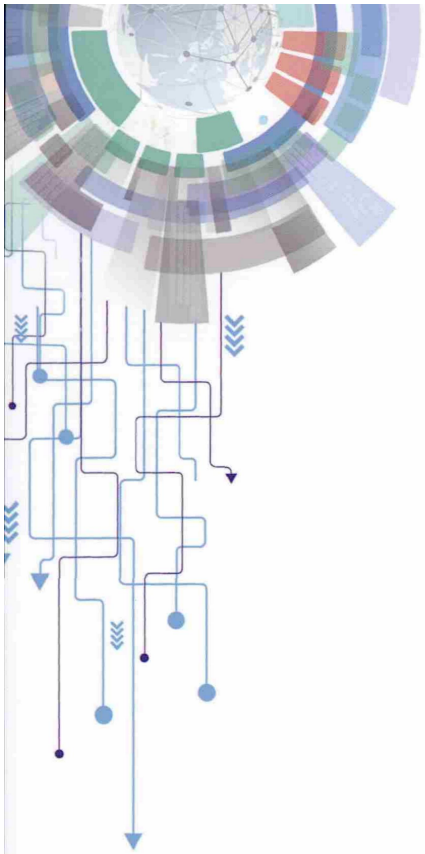
[4] William J.Murphy J LO P.Patent Valuation-Improving Decision Making through Analysis[M].Canada:John Wiley & Sons, Inc, Hoboken,New Jersey,2012.

[5] 王向红 . 历届中国专利奖获奖专利分析 [J]. 中国发明与专利 ,2019, 16(6):42-46.

[6] 杨中楷 , 梁永霞 , 刘则渊 .USPTO 中我国专利引用状况的统计分析 [J]. 图书情报工作 ,2009,53(2):42-46.

[7] 国家知识产权局知识产权发展研究中心 .2018 年中国专利调查报告 [EB/OL].(2019-01-15)[2019-05-10].http://www.cnipa.gov.cn/docs/20200309165140567125.pdf.

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net



ISSN 2095-2333

（6）高校图书馆知识产权信息服务绩效评价指标体系构建--以 60 所高校知识产权信息服务中心为例



中国高校科技
ZHONGGUO GAOXIAO KEJI

主管单位 中华人民共和国教育部
主办单位 教育部科技发展中心
出版单位 《中国高校科技》杂志社有限责任公司

总编辑 张拥军(兼)
社 长 毛殊凡
执行总编 毛殊凡(兼)
法律顾问 北京市华泰律师事务所
编辑部 刘艳玲(主任) 薛 娇(副主任) 董 黛
终 审 毛殊凡

全国中文核心期刊
(2008版、2017版、2020版)
2023版RCCSE中国核心学术期刊

地　址　北京海淀区中关村大街35号1103室
邮　编　100080

编辑部　010-62510225
　　010-62511446
运营部　010-62510207
　　010-62510209
传　真　010-62510207
E-mail　zggxkj@126.com

在线投稿网址　http://zgkc.cbpt.cnki.net
国内统一连续出版物号　CN 10-1017/N
国际标准连续出版物号　ISSN 2095-2333
邮发代号　82-842
发行范围　公开发行
国内发行　北京市报刊发行局
国外发行代号　4828M
国外发行　中国国际图书贸易集团有限公司(北京399信箱)
出版日期　每月25日出版
定价　人民币30元
印制　北京科信印刷有限公司

中国高校科技

目　次

产学研用

美国校企科技合作对大学治理的影响与借鉴
张　炜　郑　烨　1

科研管理

整体性治理与高校有组织科研协同创新能力研究
朱才朝　张发栋等　9

基于国家自然科学基金申报文本的高校学科交叉管理研究
徐　洪　罗玮琳　17

公共财政、课题机制与中国高水平大学创新
张　煜　陈瑞飞等　24

科研育人

我国关键核心技术领域人才培养机制研究
马永红　32

导师变革型领导对研究生工匠精神的影响:一个意义建构的视角
杨　治　梁　潇　36

长三角地区非部属研究型大学青年科技人才培养使用的困境与出路
卜谦祥　46

转化与服务

省级行政区域高等教育“放管服”政策创新扩散的动力机制研究
万亚文　张端鸿等　51

CHINA UNIVERSITY SCIENCE & TECHNOLOGY

2024年第4期(总第428期)

高校生物医药专利转移速度及其影响因素研究
——以南京市为例　韩　滕　王诗嘉等　58
基于t-SNE算法的高校职务科技成果转化绩效评价探索
陈　辉　柯金龙等　65

知识产权

“一体、两翼、三面向”之复合型知识产权人才培养模式探究
邓　恒　姚芳遥　71

创新体系建设

大中小学思政课教师队伍一体化建设的困境与路径探析
王冠中　刘亚欧　78
基于“建设-测量-诊断-支持-改进”的高校通识教育质量模式
——以中国海洋大学为例　贾建媛　方奇志等　85

评价与发展

学科公共性透视:大学学科交叉融合的困境及治理
高江勇　周统建　92
高校图书馆知识产权信息服务绩效评价指标体系构建
——以60所高校知识产权信息服务中心为例　刘　洋　刘　锋等　100
健康中国背景下中医药高职院校专业建设现状与发展路径研究
李姗姗　邱智东　107

官方微信

声　明:本刊已许可合作单位以数字化方式复制、汇编、发行、信息网络传播本刊全文。如作者不同意文章收录,请在来稿时向本刊声明,本刊将做适当处理。

资讯·书评·广告

高校教师专业发展支持体系的构建路径　龚春芬　I

高校学生工作信息化管理平台的搭建　唐恭贺　III

新时代美育视域下的高校舞蹈教学探索　龚　园　IV

ISSN 2095-2333
CN 10-1017/N
定价：30元/期
360元/年
ISSN 2095-2333
04
9 772095 233243

高校图书馆知识产权信息服务绩效评价指标体系构建

——以60所高校知识产权信息服务中心为例

刘　洋，刘　锋，刘熙东

（华南农业大学 图书馆，广东　广州　510642）

摘　要：文章以第一、二批获批的60所高校知识产权信息服务中心为例，探析高校知识产权信息服务的考核体系构建。根据《高校知识产权信息服务中心建设实施办法（修订）》、结合首批23家高校知识产权信息服务中心工作报告，采用网络调研法、文献调研法构建基于“全流程”的知识产权信息服务5个维度21个指标的考核体系，利用层次分析法（AHP）量化指标权重，结合模糊综合评价法对华南农业大学知识产权信息服务中心工作进行实证检验。验证结果表明，以服务基础设施改善、流程制度搭建、人员经费投入、服务内容揭示、服务成效展示5个维度的评价考核体系能较好地反映中心服务质量，为高校知识产权信息服务质量考核提供借鉴。

关键词：图书馆；高校知识产权信息服务中心；绩效评价指标体系；层次分析法；模糊综合评价法

中图分类号：G258　　**文献标识码**：A　　**文章编号**：2095-2333(2024)04-0100-07

DOI:10.16209/j.cnki.cust.2024.04.019

一、引言

知识产权保护是创新的保障，也是创新的基本要素。近年来，国家出台一系列相关政策，强调知识产权信息服务的重要性和必要性，要求加强知识产权信息服务网点建立，推动知识产权信息服务，为创新提供服务[1]。高校图书馆是知识产权信息服务建设的重要网点，其具有数据资源和人才资源优势，更具备开展深化知识产权信息业务的条件，同时高质量知识产权信息服务，将在参与产学研协同创新、科研人员的知识产权信息素养培养教育等方面发挥作用[2-4]。因此国家知识产权局规划发展司联合教育部科技发展中心经调研出台修订《高校知识产权信息服务中心建设实施办法（修订）》（以下简称《办法》）[5]。根据《办法》指导思想，国家知识产权局联合教育部将遴选有条件的高校图书馆作为高校知识产权信息服务中心，开展知识产权信息服务工作。同时要求获批的高校知识产权信息服务中心接受监督、考核，以确保建设成效。

截至2023年1月已有四批共104所高校依托本校图书馆入选国家高校知识产权信息服务中心。根据《办法》规定，中心考核周期为五年。从2019年第一批高校知识产权信息服务中心遴选名单公示至今，首批高校知识产权信息服务中心工作临近考核，如何科学动态地考核评价将是未来工作的重点。

为更好评估高校知识产权信息服务中心服务质量、探讨服务成效，定义考核维度及标准，本文通过网络调查、走访了解第一、二批获批的60所高校知识产权信息服务中心运行情况，利用层次分析法构建5个维度21个指标绩效评价体系，并通过模糊综合评价法以华南农业大学知识产权信息服务中心的运营情况和服务成效为例，验证评价体系构建的合理性。

二、高校知识产权信息服务中心运营状况分析

本文以第一、二批获批的60所高校知识产权信息服务中心为例，通过问卷调研、实地走访了解服务基础设施，与相关负责人沟通了解知识产权信息服务开展情况[6]，综合《办法》要求的考核提交材料和各中心自评考核揭露的内容进行归纳，对60所高校知识产权信息服务中心披露的数据做统计分析[7-8]（统计数据截至2022年1月，详见表1）。

根据60所高校知识产权信息服务中心的披露及调研可以看到：

（1）人员经费投入方面：95%的高校购买了商业专利数据库，平均每个中心拥有3个商业数据库，其中DII、Innography

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

是购买最多的商业专利数据库，但专门的服务管理平台，如服务预约平台、服务反馈的管理类平台较少。

(2)服务流程制度方面：50%的信息服务中心披露了业务工作流程，部分中心规章制度多参考本校管理机构拟定的规章，因此并未单独披露，已经披露的信息服务中心规章制度中平均每个中心有8条。

(3)服务项目方面：70%以上信息服务中心开展全流程服务[9]，尤其是知识产权咨询服务和专利文献检索服务开展率达到80%以上，其中清华大学、上海交通大学等第一批遴选中心已开展用户定题分析、专利数据挖掘布局等深层服务[10]，55%的信息服务中心探讨开展知识产权深层次服务，如结题知识产权布局服务等。

(4)业绩成果案例方面：55%的信息服务中心有优秀或典型案例报道，并且中山大学、南京农业大学等高校知识产权信息服务中心选送的案例入选为国家首批知识产权信息服务优秀案例。

(5)服务基础设施方面：在已披露的高校信息服务中心中，三成以上的中心尝试整合资源开展跨部门的协同办公。

表1　60所高校知识产权信息服务中心考核内容披露情况

《办法》考核要求材料	自评细分内容	已披露院校数量/所	已披露院校占比/%
1.知识产权信息服务中心专项经费投入情况，以及人员培训情况	商业专利数据库购买	57	95.0
	专业服务平台系统	7	11.7
	人员交流培训情况	44	73.3
2.知识产权信息服务政策支持情况	业务流程指引	35	58.3
	管理运营制度	22	36.7
	报告档案保管	29	48.3
3.近5年知识产权服务项目明细表	知识产权咨询服务	48	80.0
	专利文献检索服务	48	80.0
	专利法律状态更新服务	47	78.3
	知识产权培训	44	73.3
	专利查新	44	73.3
	项目期间信息服务	46	76.7
	结题知识产权布局	33	55.0
	项目报奖知识产权指导	44	73.3
	成果转化	43	71.7
	知识产权分析评议	38	63.3
4.工作成效报告书	资讯信息宣传报道情况	36	60.0
5.知识产权信息服务的经验做法、成功模式以及优秀成果的代表性案例	案例报告	33	55.0
6.要求提交的其他材料	硬件网络维护情况	8	13.3
	团队人员情况	27	45.0
	协同其他部门业绩	22	36.7

三、构建高校知识产权信息服务绩效评价指标体系

著名的管理学家Peter.F.Drucher指出，没有评价就没有管理。邱均平等强调没有科学的评价就没有科学的管理，也没有科学的决策[11]。因此开展工作绩效评价工作，有利于促进知识产权信息服务发展。国外学者Juran、Sasser和Rossander等较早开展绩效考核评价，做基于人员绩效质量、设备质量、材料质量和契约精神等方面的服务绩效评估，认为这些方向将影响服务质量[12-14]。经典的SERVQUAL模型及其改进模型则建立从企业到顾客期望的期望感知模型，至今被广泛用于服务质量的评价中[15]。Kesharwani运用期望差异(ED)和需求差异模型(DD)对信息服务进行质量考核，发现改进的ED和DD模型评估效率高于传统的SERVQUAL模型[16]。可以看到，理论研究绩效考评中，针对信息服务的考评维度较少。在实际工作中，混合评价法评估图书馆工作绩效是目前主要的评估方法。混合评价法综合了图书馆员服务水平，做到定量化研究，Yim等利用混合评价法通过用户调查、焦点小组讨论、关键信息提供、工作人员访谈等数据搜集法，评价纳米比亚地区图书馆的服务成效，结果显示混合评价法可以全方位反映图书馆表现[17]。信息服务考核研究在欧美高校中已经开展。美国是高校专利服务开展较早的国家，欧洲的PATLIB则专门成立专利图书馆开展相关的专利检索、分析和培训工作，强调要满足客户的需求同时发现更好的知识产权权利及布局将为客户提供更优质的服务[18-19]。相比于发达国家，我国知识产权信息服务开展时间较短，关于其绩效的评价文献也较少。知识产权服务方兴未艾，目前存在服务意识薄弱、服务内容和对象单一等问题[20]。针对这些问题，部分高校开始探索服务改进，如厦门大学图书馆提出面向科研的知识产权信息服务框架，东北师范大学知识产权信息服务中心针对不同服务主体开展知识产权信息服务模式，南京工业大学图书馆挖掘大学科技园知识产权信息需求，开展多样化知识产权服务工作[2,21-22]。以上为部分高校信息服务中心在第一个考核周期开展的服务，根据《教育规划纲要》明确提出绩效评价任务，要求“改进管理模式，引入竞争机制，实行绩效评估，进行动态管理”[23]。高校知识产权信息服务中心的遴选工作是持续的动态过程，构建科学的评价体系对区域乃至整个高校知识产权信息服务的业务发展具有重要意义[8,24]。

(一)评价指标的设计筛选

1.“全流程”知识产权信息服务的评价维度选取说明

知识产权信息服务实施绩效评估需要科学地确定评估要素，以便设计系统的绩效评估指标体系[25]。“全流程”知识产权

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

服务是基于高校知识产权创造、运用、保护、管理过程展开的信息服务，其服务内容涉及专利查新、专利申请、专利布局、专利转化等[26]。“全流程”知识产权信息服务贯穿科研管理和科技研究全过程，工作内容覆盖面广，因此从“全流程”知识产权信息服务角度出发，能更好地反映知识产权信息服务中心的服务情况。本文以此进行评价维度和指标选取。

在维度选取方面，充分参考高校知识产权信息服务中心建设实施办法中的考核要求[5]和首批23家遴选的高校信息服务中心工作运行报告（简称运营报告）[3]。根据《办法》和运营报告内容，高校信息服务中心应重点披露的相关信息包括中心概况、工作内容、政策支持情况、人员经费情况、典型案例、经验分享、未来规划、对高校知识产权信息服务工作宣传建议等内容。可以看到，考核维度涵盖信息服务中心从基础设施到运营以及未来重点的多个方向。知识产权服务的“全流程”化是重点披露的内容。因此本文参考考核办法和运营报告，将考核维度按服务方向纵向延伸，即将服务前期基础、服务中的内容及相关保障、服务后期成果情况合并整理为5个考核维度，分别为服务基础设施改善、流程制度搭建、人员经费投入、服务内容揭示和服务成效展示。其中服务基础设施改善重点关注信息服务中心硬件设施的改善情况、流程搭建、人员经费投入及服务内容揭示等服务运行的环节，此部分作为考核的关键。服务成效则是运营产出结果（见图1）。

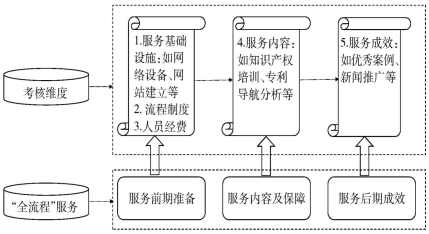


图1　服务过程划分考核维度

2.确立分析指标

在指标选取中，结合实际工作和《办法》遴选细化指标，预选22个指标作为主要考核细分维度。主要基于如下考虑：

（1）在服务基础设施改善维度中，根据《办法》第二章第八条中心成立需搭建服务平台要求，第一、二批中心在服务基础设施改善上主要表现在网站平台建设和协同平台服务，因此在服务基础设施改善维度设立中心网站建立、硬件设备及网络运行和协同其他部门3个指标。

（2）在流程制度搭建维度中，根据《办法》第四章第十九条（三）要求提供知识产权信息服务政策支持情况，各中心在业务中的流程规范体现在规章制度建立、档案管理、业务实施流程3个指标。

（3）在人员经费投入维度中，根据《办法》第四章第十九条（四）要求人员经费投入情况披露，考虑到各中心经费主要用于知识产权信息分析工具的购买使用，因此主要涵盖自建数据库搭建、团队人员组成、专利数据库购买情况3个指标。

（4）在服务内容揭示维度中，根据60所高校信息服务中心网站披露和实地走访调研总结了从基础服务到深化服务的全流程服务内容，共10个指标。服务内容揭示是最直接反映服务质量的维度。

（5）在服务成效展示维度中，根据《办法》第四章第十九条（五）对于服务成效的宣传推广，主要体现在宣传推广和案例报告2个指标。

为更好地确定指标的科学性，邀请20位重点高校负责人及骨干工作人员作为专家团队，对预选指标设计进行审核。采用德尔菲法进行指标筛选。按照积分原则，排除非必要指标。积分权重设置为：“非常重要”和“重要”权重均为0；“一般”权重为1；“不重要”权重为2；“非常不重要”权重为3。依据公式$s=\sum_{i=1}^{5}p_i q_i$计算积分，其中p表示频次，q表示权重。将打分的积分进行统计，得到$\bar{x}$=3.3，σ=2.7，标准差能反映一个数据集的离散程度，对高于平均值2个标准差指标剔除，而对平均值在2个标准差之内的指标保留[23]。由于特色服务指标在实际工作中存在难定义、难量化、难标准化等问题，且指标存在一定主观性，因此在专家调研打分中特色服务积分高于8.7，该指标被剔除。经讨论打分最终确立21个指标为本次绩效考核指标（见图2）。

（二）指标模型的构建

层次分析法（Analytic Hierarchy Process，AHP）是一种定量与定性相结合的决策方法，通过将决策元素划分为目标层、准则层、决策层，将管理目标进行结构性的分析量化，其赋值结果具有较强的客观性[24]。因此，本文利用层次分析法对目标层、准则层及指标层进行分层处理，通过建立两两比较的判断矩阵，进行一致性检验[25]；根据评价指标层级结构中确定的上下层次之间的隶属关系，运用AHP1～9评价尺度，确定重要性标度（见表2），对服务绩效评价的21个指标（见图2）进行权重赋值[27]。利用模糊综合评价法对华南农业大学进行实证检验。

1.判别矩阵构建及权重的求解

根据指标体系，利用上述标度法，通过专家咨询法、问卷调查，选取本领域专家分别对指标的重要程度进行打分，对打分结果再进行内部讨论和归纳，得到两两判别矩阵，矩阵随机一致性小于0.1，即通过随机一致性检验。一级指标集合为$B=\{B_1,B_2,B_3,B_4,B_5\}$分别表示服务基础设施改善、流

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

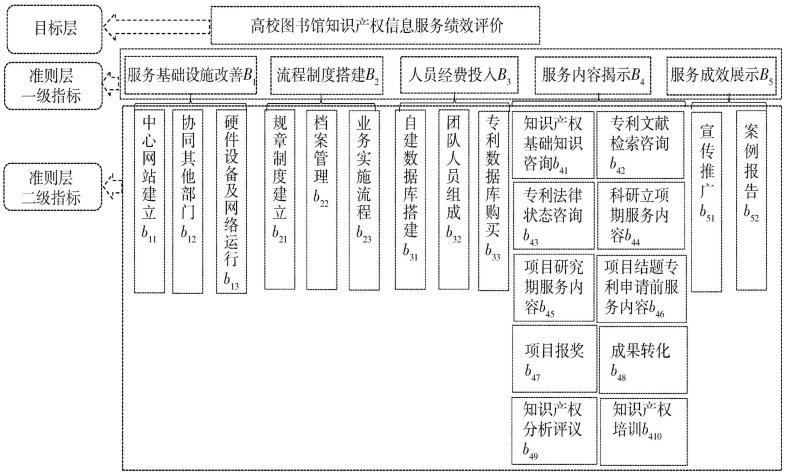


图2　高校知识产权信息服务绩效评价体系的层次结构

表2　AHP1～9评价标度及说明

标度	定义	说明
1	同等重要	i元素与j元素同等重要
3	稍微重要	i元素比j元素稍微重要
5	明显重要	i元素比j元素明显重要
7	强烈重要	i元素比j元素强烈重要
9	极端重要	i元素比j元素极端重要
2,4,6,8	上述相邻判断的折中	两种元素重要性比较介于上述标度值之间
倒数	数值的反比较	j元素与i元素比较的判断值

程制度搭建、人员经费投入、服务内容揭示、服务成效展示，具体如下：

$$\boldsymbol{A}=\begin{bmatrix}1 & 2/3 & 1/3 & 1/5 & 2/3\\ 3/2 & 1 & 1/4 & 1/4 & 2/3\\ 3 & 4 & 1 & 2/5 & 2/3\\ 5 & 4 & 5/2 & 1 & 3/2\\ 3/2 & 3/2 & 3/2 & 2/3 & 1\end{bmatrix}$$

将矩阵$\boldsymbol{A}$中每行的元素相乘，得到：

$$\boldsymbol{M}=\begin{bmatrix}0.0296\\ 0.0625\\ 3.2000\\ 75.0000\\ 2.2500\end{bmatrix}$$

通过求解$\boldsymbol{M}_i$的n次求解特征向量$\boldsymbol{W}_i$，并进行特征向量归一化处理，得到权重：

$$\boldsymbol{w}=\begin{bmatrix}0.0842\\ 0.0977\\ 0.2147\\ 0.4034\\ 0.2001\end{bmatrix}$$

计算判断矩阵$\boldsymbol{A}$的最大特征值，并根据一致性指标CI进行一致性检验，得到CI = 0.0590，平均随机一致性指标RI = 1.12。计算得到随机一致性比率CR=0.0527<0.10，因此认为判断矩阵构建合理。一级指标权重$\boldsymbol{A}$={0.087，0.0977，0.2147，0.4034，0.2001}，同理根据专家的评价结果确定二级指标各判别矩阵，并对一致性做检验。本文采用计算机MATLAB R2020a辅助计算，得出二级指标权重，$\boldsymbol{W}_{B_1}$={0.2552，0.2809，0.4638}，$\boldsymbol{W}_{B_2}$={0.3325，0.1396，0.5278}，$\boldsymbol{W}_{B_3}$={0.2402，0.3732，0.3866}，$\boldsymbol{W}_{B_4}$={0.0819，0.0321，0.0255，0.1049，0.1292，0.2186，0.1330，0.1484，0.0454，0.0810}，$\boldsymbol{W}_{B_5}$={0.7500，0.2500}（见表3）。

2. 建立模糊综合评价模型

首先建立评价集，本文采用李克特5级量表，对于每一个指标设定5个评价级别，即V=[V_1，V_2，V_3，V_4，V_5]=[优秀，良好，中等，合格，不合格]，并且赋值为V=[100，80，70，60，50]。其次采用德尔菲打分对二级指标进行评价，建立模糊关系矩阵：

$$\boldsymbol{R}=\begin{bmatrix}R_{u_1}\\ R_{u_2}\\ \cdots\\ R_{u_p}\end{bmatrix}=\begin{bmatrix}Y_{11} & Y_{12} & \cdots Y_{1m}\\ Y_{21} & Y_{22} & Y_{2m}\\ Y_{P1} & Y_{P2} & Y_{Pm}\end{bmatrix}$$

其中m=5，表示5个评价等级，p=21，表示21个二级评价指标[28]。由于指标的模糊性，可以综合指标的打分次数，得出指标等级的隶属度，根据一级指标模糊向量$\boldsymbol{X}_i=\boldsymbol{W}_{B_i}\times\boldsymbol{R}_i$，模糊综合评级矩阵$\boldsymbol{U}$与一级指标权重$\boldsymbol{A}$相乘，综合评分标度得到最终的综合得分。

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

表3 高校知识产权信息服务绩效评价指标权重

一级指标层	权重	二级指标层	权重	综合权重
服务基础设施改善B_1	0.0842	中心网站建立b_{11}	0.2552	0.0215
		协同其他部门b_{12}	0.2809	0.0237
		硬件设备及网络运行b_{13}	0.4638	0.0391
流程制度搭建B_2	0.0977	规章制度建立b_{21}	0.3325	0.0325
		档案管理b_{22}	0.1396	0.0136
		业务实施流程b_{23}	0.5278	0.0516
人员经费投入B_3	0.2147	自建数据库搭建b_{31}	0.2402	0.0516
		团队人员组成b_{32}	0.3732	0.0801
		专利数据库购买b_{33}	0.3866	0.0830
服务内容揭示B_4	0.4034	知识产权基础知识咨询b_{41}	0.0819	0.0330
		专利文献检索咨询b_{42}	0.0321	0.0129
		专利法律状态咨询b_{43}	0.0255	0.0103
		科研立项期服务内容b_{44}	0.1049	0.0423
		项目研究期服务内容b_{45}	0.1292	0.0521
		项目结题专利申请前服务内容b_{46}	0.2186	0.0882
		项目报奖b_{47}	0.1330	0.0537
		成果转化b_{48}	0.1484	0.0599
		知识产权分析评议b_{49}	0.0454	0.0183
		知识产权培训b_{410}	0.0810	0.0327
服务成效展示B_5	0.2001	宣传推广b_{51}	0.7500	0.1501
		案例报告b_{52}	0.2500	0.0500

四、基于模糊层次分析法的华南农业大学知识产权信息服务中心服务绩效评价

为更好地检验模糊层次分析法在服务绩效评价模型的有效性，本文选取华南农业大学知识产权信息服务中心作为检验对象，对其开展的服务进行评价。

（一）检验对象确定及数据收集

华南农业大学为第二批遴选认定的高校知识产权信息服务中心（2020年），其专职服务人员为6位，制定完善相关业务流程制度9部；在自建库方面，承担广东省战略新兴产业中现代农业产业专利数据库的建设更新工作；开展的服务工作包括基础的知识产权培训宣传[29]和知识产权深层服务如专利申请评估、专利导航分析等，服务工作涵盖“全流程”知识产权信息服务的大部分内容，工作开展较为全面。其服务成果案例在广东省科学技术情报学会、广东省高等学校图书情报工作指导委员会中发布[30]。考虑其认定时间已至中后期且服务工作开展全面有一定产出案例推广，具有一定的代表意义。

为更好地模拟绩效考核过程，本次邀请15位高校知识产权信息服务中心的负责人根据二级考核指标对华南农业大学知识产权信息服务中心开展的工作进行评价打分。评价共分5个等级，分别为优秀、良好、中等、合格和不合格。根据评价结果，华南农业大学知识产权信息服务中心在规章制度建立、专利文献检索咨询和专利法律状态咨询3项工作中得到满分（15票优秀），在成果转化和知识产权分析评议工作分别出现3票和2票的中等级别投票，其余工作得分均集中在优秀和良好等级。

（二）模型拟合程度检验

利用模糊综合评判的方法对华南农业大学知识产权信息服务中心绩效进行实证检验。

1. 评价指标隶属度计算

本次打分评价等级遵从李克特5级量表，且赋分值不变。综合15专家对华南农业大学服务指标的打分次数，得出该指标属于的评语等级的隶属度，取多位赞同该指标的评价等级的比重为隶属度（见表4），从而建立单因素模糊综合评判矩阵，计算结果如下：

表4 华南农业大学知识产权信息服务中心二级指标隶属度

二级指标层	优秀	良好	中等	合格	不合格
中心网站建立b_{11}	0.8667	0.1333	0.0000	0.0000	0.0000
协同其他部门b_{12}	0.6667	0.3333	0.0000	0.0000	0.0000
硬件设备及网络运行b_{13}	0.7333	0.2667	0.0000	0.0000	0.0000
规章制度建立b_{21}	1.0000	0.0000	0.0000	0.0000	0.0000
档案管理b_{22}	0.8667	0.1333	0.0000	0.0000	0.0000
业务实施流程b_{23}	0.6667	0.3333	0.0000	0.0000	0.0000
自建数据库搭建b_{31}	0.6667	0.3333	0.0000	0.0000	0.0000
团队人员组成b_{32}	0.9333	0.0667	0.0000	0.0000	0.0000
专利数据库购买b_{33}	0.6667	0.3333	0.0000	0.0000	0.0000
知识产权基础知识咨询b_{41}	0.8667	0.1333	0.0000	0.0000	0.0000
专利文献检索咨询b_{42}	1.0000	0.0000	0.0000	0.0000	0.0000
专利法律状态咨询b_{43}	1.0000	0.0000	0.0000	0.0000	0.0000
科研立项期服务内容b_{44}	0.6667	0.3333	0.0000	0.0000	0.0000
项目研究期服务内容b_{45}	0.8667	0.1333	0.0000	0.0000	0.0000
项目结题专利申请前服务内容b_{46}	0.9333	0.0667	0.0000	0.0000	0.0000
项目报奖b_{47}	0.8667	0.1333	0.0000	0.0000	0.0000
成果转化b_{48}	0.6667	0.1333	0.2000	0.0000	0.0000
知识产权分析评议b_{49}	0.6667	0.2000	0.1333	0.0000	0.0000
知识产权培训b_{410}	0.8000	0.2000	0.0000	0.0000	0.0000
宣传推广b_{51}	0.8667	0.1333	0.0000	0.0000	0.0000
案例报告b_{52}	0.7333	0.2667	0.0000	0.0000	0.0000

服务基础设施改善B_1对应模糊关系矩阵：

$$\boldsymbol{R}_1=\begin{bmatrix}0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\\ 0.7333 & 0.2667 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}$$

同理可得其他二级指标的模糊隶属度：

$$\boldsymbol{R}_2=\begin{bmatrix}1.0000 & 0.0000 & 0.0000 & 0.0000 & 0.0000\\ 0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}$$

$$\boldsymbol{R}_3=\begin{bmatrix}0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\\ 0.9333 & 0.0667 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}$$

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

$$\boldsymbol{R}_4=\begin{bmatrix}0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 1.0000 & 0.0000 & 0.0000 & 0.0000 & 0.0000\\ 1.0000 & 0.0000 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\\ 0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.9333 & 0.0667 & 0.0000 & 0.0000 & 0.0000\\ 0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.1333 & 0.2000 & 0.0000 & 0.0000\\ 0.6667 & 0.2000 & 0.1333 & 0.0000 & 0.0000\\ 0.8000 & 0.2000 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}$$

$$\boldsymbol{R}_5=\begin{bmatrix}0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.7333 & 0.2667 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}$$

2. 模糊综合评价得分

以服务基础设施改善B_1指标为例，对应的权重是$\boldsymbol{W}_{11}$=[0.2552　0.2809　0.4638]；服务基础设施改善B_1的评价向量为$\boldsymbol{X}_1=\boldsymbol{W}_{B_1}\times\boldsymbol{R}_1$。

$$\boldsymbol{X}_1=(0.2552\quad 0.2809\quad 0.4638)\times\begin{bmatrix}0.8667 & 0.1333 & 0.0000 & 0.0000 & 0.0000\\ 0.6667 & 0.3333 & 0.0000 & 0.0000 & 0.0000\\ 0.7333 & 0.2667 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}=$$

$$(0.7486\quad 0.2513\quad 0.0000\quad 0.0000\quad 0.0000)$$

同理可得：

流程制度搭建B_2的评价向量

$$\boldsymbol{X}_2=(0.8054\quad 0.1945\quad 0.0000\quad 0.0000\quad 0.0000)$$

人员经费投入B_3的评价向量

$$\boldsymbol{X}_3=(0.7662\quad 0.2338\quad 0.0000\quad 0.0000\quad 0.0000)$$

服务内容揭示B_4的评价向量

$$\boldsymbol{X}_4=(0.8238\quad 0.1405\quad 0.0357\quad 0.0000\quad 0.0000)$$

服务成效展示B_5的评价向量

$$\boldsymbol{X}_5=(0.8333\quad 0.1667\quad 0.0000\quad 0.0000\quad 0.0000)$$

整体评价向量

$$\boldsymbol{U}=(0.0842\quad 0.0977\quad 0.2147\quad 0.4034\quad 0.2001)\times\begin{bmatrix}0.7486 & 0.2513 & 0.0000 & 0.0000 & 0.0000\\ 0.8054 & 0.1945 & 0.0000 & 0.0000 & 0.0000\\ 0.7662 & 0.2338 & 0.0000 & 0.0000 & 0.0000\\ 0.8238 & 0.1405 & 0.0357 & 0.0000 & 0.0000\\ 0.8333 & 0.1667 & 0.0000 & 0.0000 & 0.0000\end{bmatrix}=$$

$$(0.8053\quad 0.1804\quad 0.0144\quad 0.0000\quad 0.0000)$$

根据设定的5个评价级别的赋值$\boldsymbol{V}$=[100,80,70,60,50]，整体评分值：

$$\boldsymbol{F}=\boldsymbol{V}\boldsymbol{U}^{\mathrm{T}}=[100\quad 80\quad 70\quad 60\quad 50]\begin{bmatrix}0.8053\\ 0.1804\\ 0.0144\\ 0.0000\\ 0.0000\end{bmatrix}=95.9679$$

华南农业大学的整体评分值为95.9679，介于优秀与良好之间。用同样的方法计算出每个指标的评分值（见表5）。

（三）评价结果分析

从模糊层次分析法的计算结果中得出，在一级指标维度层面，重点考核的方向为服务内容揭示、人员经费投入和服务成效展示。其中服务内容揭示占比较大超过40%，其次是人员经费投入和服务成效展示维度的权重都超过20%。可以看出考核侧重服务过程中，中心运营投入情况，开展的服务内容、服务成效的推广情况。在二级指标中，专利申请前服务（b_{46}）占比较高，为考核工作的重点。主要原因包括高校专利申请量较大，有一定专利评估需求；且专利申请前的审查工作与科技查新有相通之处，科技查新的标准规范在专利前置审查服务中有借鉴意义。因此，此项工作更易量化考察。在人员经费投入中，二级指标团队人员组成（b_{32}）和专利数据库购买（b_{33}）的情况是绩效评价的侧重点，人员和经费情况更能反映中心运行投入，运行顺利，则增加投入。宣传推广（b_{51}）成效主要考察服务质量和认可程度，为其他中心工作树立典范。综上，华南农业大学知识产权信息服务中心在规章制度完善、专利文献检索、法律状态查询方面表现为优秀，基础性工作开展有规范流程且已在网站公示，但在促进成果转化方面参与较少，知识产权分析评议工作量不足，因此评分较低，后续工作有待提高。

表5　华南农业大学知识产权信息服务中心评分值

一级指标层	评分值	二级指标层	评分值
服务基础设施改善B_1	94.9632	中心网站建立b_{11}	97.3333
		协同其他部门b_{12}	93.3333
		硬件设备及网络运行b_{13}	94.6667
流程制度搭建B_2	96.0991	规章制度建立b_{21}	100.0000
		档案管理b_{22}	97.3333
		业务实施流程b_{23}	93.3333
人员经费投入B_3	95.3237	自建数据库搭建b_{31}	93.3333
		团队人员组成b_{32}	98.6667
		专利数据库购买b_{33}	93.3333
服务内容揭示B_4	96.1183	知识产权基础知识咨询b_{41}	97.3333
		专利文献检索咨询b_{42}	100.0000
		专利法律状态咨询b_{43}	100.0000
		科研立项期服务内容b_{44}	93.3333
		项目研究期服务内容b_{45}	97.3333
		项目结题专利申请前服务内容b_{46}	98.6667
		项目报奖b_{47}	97.3333
		成果转化b_{48}	91.3333
		知识产权分析评议b_{49}	92.0000
		知识产权培训b_{410}	96.0000
服务成效展示B_5	96.6667	宣传推广b_{51}	97.3333
		案例报告b_{52}	94.6667

五、结论

高校知识产权信息服务已开展一段时间，通过建立符合工作实际的评价体系进行评价考核是十分必要的。本文从“全流程”知识产权信息服务角度出发，提出服务基础设施改

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

善、流程制度搭建、人员经费投入、服务内容揭示和服务成效展示5个考察维度，并将5个维度分别细化形成具体二级指标进行考核，应用层次分析法和模糊综合评价法，形成量化的考核指标体系，力求使考核体系更加科学、精准，满足考核要求。

作者简介：刘洋，华南农业大学图书馆，馆员，主要研究方向为专利信息分析、网络情报分析；刘锋，华南农业大学图书馆，副研究馆员，馆长，主要研究方向为图书情报；刘熙东，华南农业大学图书馆，副研究馆员，主要研究方向为专利信息分析。

[基金项目：2023年广东省图书馆科研课题“高校图书馆信息服务绩效评价体系构建——以知识产权信息服务为例”(GDTK23030)]

参考文献：

[1] 国务院关于印发“十四五”国家知识产权保护和运用规划的通知[Z]. 国发〔2021〕20号.

[2] 孙波，邹云龙，吴闯，等. 服务群体视角下高校图书馆知识产权信息服务探索——以东北师范大学知识产权信息服务中心为例[J]. 图书馆学研究，2020(24)：43-50.

[3] 徐春，张静，卞祖薇. “双一流”建设背景下高校图书馆专利信息服务现状及发展对策研究[J]. 图书馆学研究，2019(23)：57-64.

[4] 王峻岭，刘敬仪，陈嘉明，等. 高校专利信息服务现状与支持科研管理路径设计[J]. 图书情报工作，2020，64(1)：146-152.

[5] 国家知识产权局办公室 教育部办公厅关于印发《高校知识产权信息服务中心建设实施办法(修订)》的通知[Z]. 国知办发服字〔2021〕23号.

[6] 晁蓉，涂湘波，梁丽群. 高校图书馆知识产权信息服务内容调查与建设研究[J]. 情报探索，2021(4)：96-104.

[7] 李心蕊. 高校图书馆知识产权信息服务能力实效性研究——基于AHP-FCE模型的量化分析[J]. 河南图书馆学刊，2020，40(5)：48-52.

[8] 邓灵斌. 新形势下的高校图书馆知识产权信息服务评估指标体系构建[J]. 图书馆学研究，2020(22)：59-65.

[9] 刘秀文，李峰. 高校知识产权信息服务总体框架及其应用实现——以北京大学图书馆为例[J]. 图书情报工作，2020，64(16)：22-28.

[10] 雷琴，刘芳. 高校图书馆专利挖掘信息服务模式的构建[J]. 大学图书馆学报，2022，40(4)：54-63.

[11] 邱均平，张裕晨，周子番. 新时代我国科研评价体系重构中必须处理好八大关系[J]. 中国图书馆学报，2021，47(1)：47-60.

[12] JURAN J M，GRYNA F M，BINGHAM R S. Quality Control Handbook[M]. New York：McGraw-Hill，1974.

[13] SASSER W E，OLSEN R P，WYCKOFF D D. Management of Service Operations：Text，Cases，and Readings[M]. Boston：Allyn and Bacon，1978.

[14] ROSSANDER G. Service Quality：a Study of Quality Dimension[M]. Helsinki：Service Management Institute，1982.

[15] PARASURAMAN A，BERRY LL，ZEITHAML VA. Understanding Customer Expectations of Service[J]. Sloan Management Review，1991，32(2)：12-40.

[16] KESHARWANI A，MANI V，GAUR J，et al. Service quality measurement in information systems[J]. Journal of Global Information Management，2021，29(6)：1-19.

[17] YIM M，FELLOWS M，COWARD C. Mixed-methods library evaluation integrating the patron，library，and external perspectives：the case of Namibia regional libraries[J]. Evaluation and Program Planning，2020，79：101782.

[18] ARTELSMAIR G，KRESTEL H，KNOTH L. The future of PATLIB centres in a globalized patent world[J]. World Patent Information，2009，31(3)：184-189.

[19] 冯君. 美国大学图书馆专利信息服务实践及启示——基于被认定为PTRC的大学图书馆的研究[J]. 图书情报工作，2017，61(21)：56-63.

[20] 周静，张立彬，谷文浩. 我国高校图书馆知识产权信息服务的现状与思考[J]. 图书情报工作，2019，63(21)：35-46.

[21] 李剑，赵黎黎，林静，等. 面向科研的高校图书馆知识产权信息服务研究[J]. 情报科学，2021，39(10)：56-62.

[22] 晁蓉，黄筱玲，姚建文. 高校图书馆知识产权信息服务模式构建——基于内容分析法的尝试[J]. 图书馆，2021(9)：19-26.

[23] 邱均平.《教育规划纲要》解决了绩效评价的合法性问题[J]. 大学(学术版)，2011(10)：34-36.

[24] 李剑，尤伟光，林静. 面向区域创新的高校图书馆知识产权信息服务绩效评价研究[J]. 情报科学，2023，41(6)：161-169+191.

[25] 彭剑锋. 绩效指标体系的构建与维护[M]. 上海：复旦大学出版社，2008.

[26] 冉从敬，宋凯，何梦婷，等. 知识产权生态链下的高校知识产权信息服务平台构建[J]. 图书馆论坛，2020，40(3)：63-72.

[27] 林杰，张欣琪，刘业青. 出国留学风险评估模型的构建与应用——基于英美两国的评价[J]. 高校教育管理，2023，17(1)：100-114.

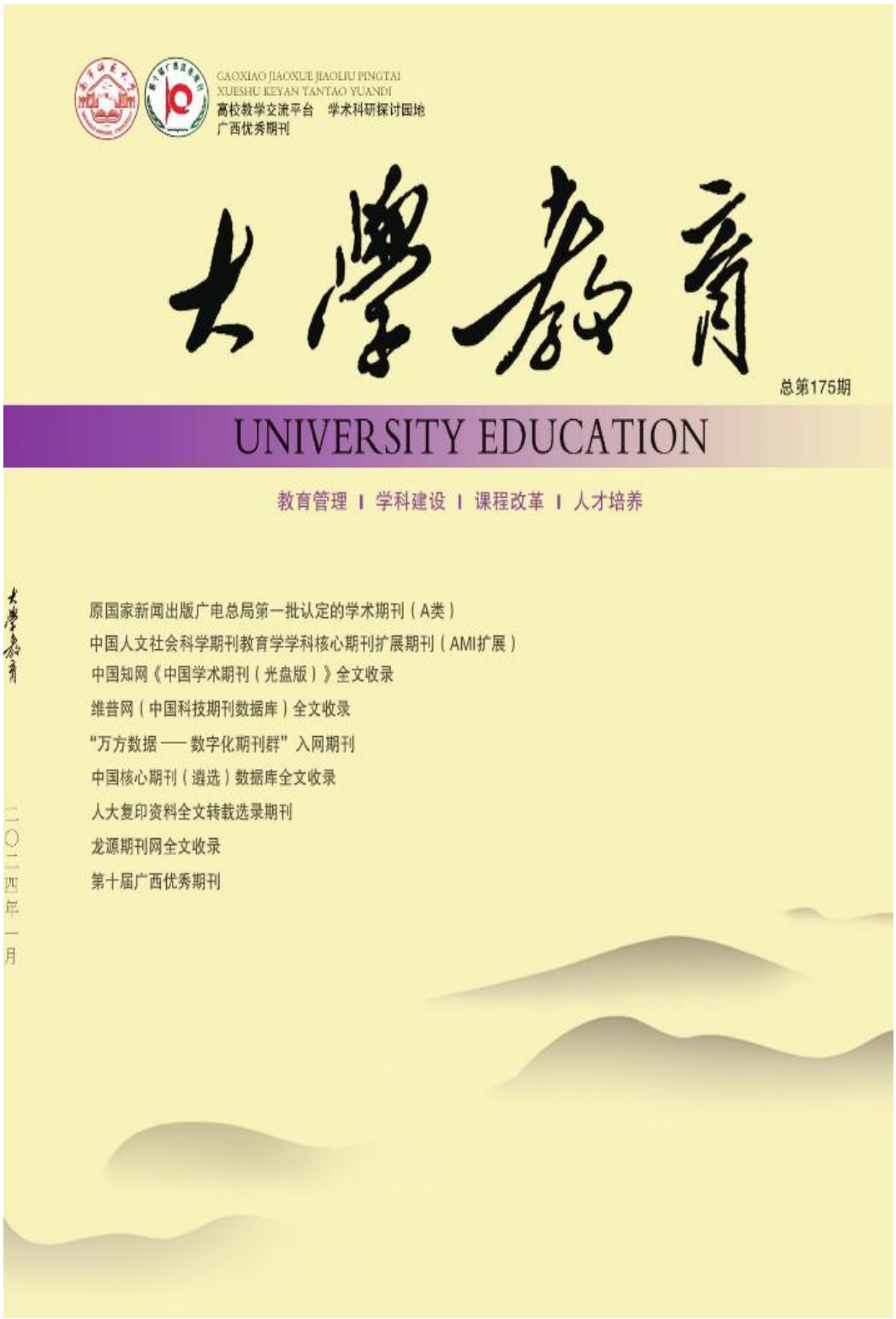
[28] 赵静，丁一凡，赵旭阳. 基于模糊层次分析法的社交媒体隐私安全量化评估研究[J]. 情报理论与实践，2022，45(9)：135-141.

[29] 宋玉梅，严哲，朱琳，等. 微信视域下高校知识产权信息服务的现状与发展对策研究[J]. 图书情报工作，2021，65(3)：51-60.

[30] 华南农业大学知识产权信息服务中心. 我校“高质量专利培育布局情报服务”荣获2020年度广东省优秀科技情报成果一等奖[EB/OL]. (2021-01-18)[2023-08-29]. https://lib.scau.edu.cn/2021/0118/c14237a266798/page.htm.

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

（7）新媒体时代高校网络舆情演化机理及对策研究



高校教学交流平台　学术科研探讨园地

DAXUE JIAOYU

大學教育

UNIVERSITY EDUCATION

2024年1月　半月刊
（2024年第1期　总第175期）
2024年1月1日出版

主　单　位　南宁师范大学
办　单　位　南宁师范大学
版　单　位　广西现代教育杂志社
主　社　长　黎海英
　　编　黎海英
　社　长　戴　勇　邓国勋
　　编　黎海英
于　主　编　雷　艳
副　主　编　钟　岚
主　　编　周侯辰
　　辑　庞丹丹　刘凤华　苏祎颖
　　梁金凤
　编　辑　林志恒　张　雷　黄紧德
　编　辑　庞志丹
　电　话　(0771)5863927
　　(0771)5863137
飞一官网　http://www.dxjygw.com
比稿平台　http://47.107.83.107:9103/#/login
　　刷　广西壮族自治区地质印刷厂
　　阅　全国各地邮政局(所)
　　行　广西邮政书报刊发行局
　代　号　48-21
准连续出版物号
2095-3437
5-1387/G4
25.00元

目　次

◆ 教育管理 ◆

地方高校博士后队伍建设的探索
——以北京建筑大学为例
…… 侯嘉毅　曹晓云　丁　丁　(1)

学生满意度视角下硕士研究生招生宣传策略实证研究
…… 田仁飞　(4)

新媒体时代高校网络舆情演化机理及对策研究
…… 刘　洋　(8)

乡村振兴背景下乡村学校文化教育发展问题探析
…… 赵芝华　占　琦　(14)

◆ 学科建设 ◆

面向产业革命的行业特色院校专业体系升级
——以中国民用航空飞行学院为例
…… 武丁杰　(18)

欢迎使用本刊投审稿系统

《大学教育》投审稿系统已正式上线（原投稿邮箱 daxuejiaoyu100@163.com 已停用），敬请认准本刊唯一官方投审稿系统：http://47.107.83.107:9103/#/login。登录投审稿系统进行注册后即可在线投稿。期待广大新老作者惠赐佳作！

大學教育

主管单位：南宁师范大学
主办单位：南宁师范大学
主编：黎海英
编辑：《大学教育》编辑部
地址：广西南宁市鲤湾路 17 号
邮编：530022
联系电话：（86）0771-5863927

Supervised by:Nanning Normal University
Sponsored by:Nanning Normal University
Chief Editor:LI Haiying
Edited by:Editorial Department of University Education
Address:No. 17 Liwan Road, Nanning, Guangxi
Postcode:530022
Telephone:(86)0771-5863927

ISSN 2095-3437

国际标准连续出版物号：ISSN 2095-3437
国内统一连续出版物号：CN 45-1387/G4

邮发代号：48-21
全国各地邮局（所）订购
定价：25.00 元

新媒体时代高校网络舆情演化机理及对策研究

刘 洋

华南农业大学图书馆,广东 广州 510642

[摘 要]新媒体环境下,高校网络舆情成为一种新兴的信息情感表达方式。高校师生作为网络媒介使用的重要群体,关注和引导其在网络舆情中的情感诉求与表达,在高校管理和思政教育中尤为重要。文章通过解释高校网络舆情的定义内涵,重点分析了高校网络舆情生成机理及舆情主体(高校师生)在网络中的聚合方式,厘清了高校网络舆情传播过程节点和传播特征。分析表明,高校舆情发展受空间因素和舆情主体情感因素影响,舆情主体通过链式、圈式聚集情感联系,在此过程中情感倾向易出现"群体极化"效应,而高校网络意见领袖在舆情传播中发挥的效力更大。因此,高校舆情监管应加强舆情主体主流思想教育,引导学生树立社会主义核心价值观,积极构建健康的高校网络舆情环境。

[关键词]高校网络舆情;舆情传播;群体极化;意见领袖;舆情监管

[中图分类号]G64 [文献标识码]A [文章编号]2095-3437(2024)01-0008-06

数字媒介的兴起,标志着传统媒体逐渐过渡到信息化传媒时代,这为大众的多元化舆论表达提供了技术支持。新媒体环境下网络舆情发展成为一种新兴的游离于主流现实言论环境之外的信息情感表达方式[1]。面对新媒体环境下网络舆情发展的特点,习近平总书记高度重视网络舆情意识形态问题,在党的二十大报告中明确提出"加强全媒体传播体系建设,塑造主流舆论新格局。健全网络综合治理体系,推动形成良好网络生态"[2]。加强网络话语传播平台的建设和管理,加强主流意识形态网络话语阵地建设,是营造健康网络环境的基石[3]。高校作为思想教育的重要战场,肩负着人才培养、文化传承等重任,也是青年群体精神塑造、三观形态形成的主要基地。增强青年主流意识形态认同,是社会主义意识形态建设的重要举措,更是高校思政课创新发展的重要内容[4]。

如何利用纷繁复杂的网络舆情信息引导高校师生正确表达情绪,加强高校舆情网络监管,对网络舆情态势的发展具有重要意义,同时也是高校思想政治教育的重要环节[5]。笔者从网络舆情的定义内涵出发,将高校网络舆情作为主要研究对象,分析其生成机理及特征,梳理高校网络舆情的传播过程和传播特点,同时对高校网络舆情风险防控机制进行论述,为高校舆情监管提供借鉴。

一、高校网络舆情的定义、内涵

根据中国历史文献记载,"舆"字的基本含义是"众","情"字的解释很多,与舆情连接起来使用,《词源》解释为"民众的意愿"。这一解释是把"舆"与"情"两个字相连进行的最直白的字意解释[6]。现实中进一步扩展舆情含义为"舆论情况"的简称,是指在一定的社会空间内,围绕中介性社会事件的发生、发展和变化,作为主体的民众对作为客体的社会管理者及其政治取向产生和持有的社会政治态度。它是较多群众关于社会中各种现象、问题所表达的信念、态度、意见和情绪等表现的总和[7]。网络舆情源于公众舆论的相关研究,是计算机科学技

[收稿时间]2023-07-24

[基金项目]2020年广东省普通高校青年创新人才项目"新时期网络舆情对大学生情感取向演化的模型研究"(2020WQNCX007)。

[作者简介]刘洋(1989—),女,内蒙古人,硕士研究生,馆员,研究方向为信息素养教育、舆情信息分析。

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

术发展的衍生物[8]，高校网络舆情是社会公众网络舆情的一部分，其发生范围与发生群体都有较强的限定性[9]。汤力峰、赵昕丽提出高校网络舆情是在突发性事件、国内外热点问题、师生利益诉求的激化中形成的[10]。高校舆情包括主体、客体、中介性社会事项、传播过程等，其中主体指的是广大师生；客体包括关乎师生、员工利益的以及为大多数师生、员工发声的社会事件；中介性社会事项在外延上包括国家管理者，制定和实施的各类方针政策、制度、法规、工作措施，也包括影响民众利益及主客体利益关系变化的事件、人物，还包括工作成就和存在的各种主要问题等[6,11-13]。

二、高校网络舆情的生成机理及聚集特征

（一）高校网络舆情的生成机理

高校网络舆情的生成包括主体因素、客体因素和空间要素等。客体因素是触发舆情的首要环节，具有中介性的客体发生刺激主体即高校师生的情绪反馈[13]。高校之所以形成较为独立的网络舆情环境，是因为高校具有空间要素，其明显的社团结构型社区网络，不同于随机均匀网络，具有信息传播传染临界值低，感染密度较大，传播阈值也比较低的特点[14]。在高校网络舆情情感倾向形成方面，群体极化效应是促其生成的重要因素。美国学者Stoner最早提出了“群体极化”理论，有学者认为群体极化指群体起初在针对某一社会问题或现象时带有某些倾向性，在经过讨论后，原来支持的意见会变得更支持，原来反对的意见则反对的程度会更强，最后导致极端观点的形成[15-17]。高校网络舆情特有的空间地域性及主体较为相近的教育环境，使得在热点发生后，高校舆情主体较快产生情感共鸣，并逐渐形成主流倾向，在彼此的认同中强化认知倾向[15]。因此，高校网络舆情的发生受空间因素影响较大，其客体因素触发了主体的情绪表达，群体极化效应则强化了高校网络舆情的主体倾向。

（二）高校网络舆情主体特征及聚合方式

高校网络舆情传播速度快、发声活跃，能较快产生群体倾向性意见、领袖意见等，这与舆情主体及聚集方式有着密切关联。高校网络舆情的生成机理见图1。

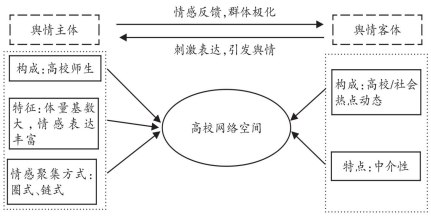


图1　高校网络舆情的生成机理

1.舆情主体基数大且情感表达丰富

据中国教育信息网统计，2021年全国共有高等学校3012所，各种形式的高等教育在学总规模4430万人[18]。在校生信息接受能力普遍较强，能较快掌握网络技术，是活跃的网民群体之一。2021年在校大学生网民，日均上网时长为3~6小时的占比为45.8%；日均上网时长达6小时以上的占比为33.7%。网民覆盖率达到100%[19]。由此可见，高校大学生舆情主体基数大，在网时间活跃，网络信息数据庞大，这为高校网络舆情的传播提供了基础。

在高校舆情情感表现中，在校大学生的情感表达意愿强烈。圈层化效应使大学生较快产生共鸣[20]，特别是大学生知识密集，接受新鲜事物的愿望强烈，适应能力强，且正值世界观、人生观、价值观等意识形态形成期，对社会事件、校园事件等存在较高关注度。高校舆情聚焦于校园热点问题，话题关注度高，受众主要为在校学生，能够产生比普通舆情传播速度更快、传播范围更广的影响力[21]。通过情感聚类分析了解到大学生由于社会心态和社会经验不足，认识事物不够全面，情感表达较为直接，容易偏激，主题极化是其主要的表现形式[22-23]。因此，对高校舆情主体的情感倾向分布情况进行及时把握和预测，有利于对舆情主体的情感倾向进行针对性的引导。

2.圈式、链式集合方式加速聚集

在校大学生是高校网络舆情主体的主要组成部分，每个人都是不同网络社群成员，具有网络社群相互吸引的结构化特征[24]。网络社群互吸方式包括圈式结构和链式结构。对大学生而言，圈式结构主要指在特定范围中网络社群成员在圈内活动，圈内成员有较为相似的爱好等特征[25]，以聊天室、

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

BBS、网络论坛、豆瓣网等网络应用的形式存在。链式结构表现为成员之间的交流都以相识或“熟人”关系进行交流，QQ群、微信和其他社交网站、人人网、开心网等社交网站为其主要沟通方式[26]。无论是圈式结构或链式结构，在网络空间中，大学生一般围绕信息的文化价值进行社交，偏向于结识与自己年龄、经历、学识同质或相似的朋友。根据心理学观点，大学生群体具有相互交往频率高、相互影响和人际吸引力大、相互关系持续时间长、群体认知和群体目标共性强等群体心理特征[27]，因此其更容易通过圈式、链式结构相互吸引，常常关注地域乃至单位热点信息，更容易形成地域的小范围舆情热点，并有可能通过线下社会活动产生更大影响[28]。

三、高校网络舆情传播过程及特征

新媒体融合环境下，高校网络舆情传播是一个动态过程，呈现多向度、互动性、非线性传播。新的传播方式和传播媒介以及自媒体形式的介入，增强了舆情传播的干扰和多元反馈，高校网络舆情的传播也在新媒体环境中呈现新特征，具体见图2。

（一）高校网络舆情传播过程

根据网民情绪变化的维度，网络舆情可划分为比较典型的形成、高涨、波动和淡化四个阶段[29]。高校网络舆情同样遵循这四个阶段，其舆情发展主要伴随高校舆情主体大学生的思想动态而演变波动，主要表现在形成期舆论倾向孕育，话题热度开始生成；高涨期舆情主体意见倾向显现，舆情传播体量加大，扩散加速，此时意见领袖会显现，群体极化效应开始出现；在波动期群体极化效应会固化高校舆情情感倾向，而此时高校舆情情感倾向会随着意见领袖的出现发生一定波动；在淡化期，随着时间推移，新的舆情热点出现或取代旧的舆情热点，从而使舆情意见热度下降，逐渐淡出，表现平静[30-31]。

（二）高校网络舆情的传播特征

高校网络舆情的传播特征是由舆情产生的特征裂变衍生出来的。

从传播速度看，新媒体具有内容丰富、信息量大、双向互动等优点，加之自媒体传播方式日益兴起，高校网络舆情借助新工具使得舆情传播速度更快、范围更广。

从传播内容及传播节点分析，高校网络舆情内容涉及范围包括社会敏感话题和热点问题，其中校园事件的关注度会更容易引起转发、评论。高校网络舆情传播媒介包括微博、微信、BBS等，舆情信息通过文字、图像、录像等方式发布出去，因此传播呈分散型多级传播特点。高校网络舆情各传播节点间存在关联关系[33]，在原始事件（舆情客体）暴发后，经过多个关联节点的多级传播，最终造成高校网络舆情的扩散与发酵[34]。在各级传播节点中，网络意见领袖的传播影响力更大，采用计算实验法分析后发现，表面分散的群体观点最终朝向意见网络领袖所持的观点逐渐偏移[35]。在网络舆情的传播中，网络意见领袖作为较大的传播主体，其发言的情感倾向性将影响高校网络舆情走向，特别是在高校舆情高涨和波动期，有关部门很难准确预判其影响力，这使高校舆情应对能力受到考验[36]。

在高校舆情传播中，负面网络舆情传播存在“放大效应”，相较于校外人员，高校负面网络舆情对高校师生群体影响更大[37]。因此，对于高校而言，加强高校网络舆情监管，对舆情主体思想进行正面引导，强化主流思想教育，在网络洪流中坚持

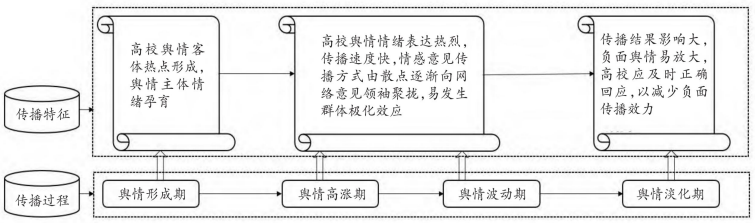


图2　高校网络舆情传播过程及特征

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved.　http://www.cnki.net

正确的世界观、人生观、价值观是高校思政教育和管理的重要课题。

四、高校网络舆情危机防控管理机制

（一）加强舆情主体主流思想教育

在网络时代，应开展意识形态建设工作，加强网络话语引导，把握正确舆论导向，唱响主旋律，壮大正能量，做大做强主流思想舆论。

高校是国家培养人才的重要场所，目前聚集着几千万青年学生，思想政治教育对于高校“立德树人”的实现有着重大作用。高校要引导青年学生树立正确的价值标准，培养青年学生具有社会主义核心价值观，正如习近平总书记强调的“要抓住青少年价值观形成和确定的关键时期，引导青少年扣好人生第一粒扣子”[38]。

（二）提升高校管理部门风险防控能力

高校舆情的发展状态与高校管理部门的风险防控及公关能力紧密相关。高校管理者应做到：第一，具有处理危机的权威性。高校管理者应是官方解释代表，对事项进行解释及处理。第二，既有具体的工作角色，又是广大师生的“利益代表”，为师生办实事，解决实际问题。第三，具有制度把关能力，是高校有关法律法规的解读者，相关政策、工作措施的制定者，事件和活动等事项的协调者。第四，对待舆情的态度和决策选择有制约性。当高校舆情发生时，高校管理者应具备舆情公关能力，采用正确的态度方式化解舆情危机。新媒体时代高校网络舆情风险防控必须将理论与实践相结合。

首先，高校要设立专门网络风险防范机构，即专岗专职，由专门管理人员和专业技术人员组成。在运行过程中学校、院校以及学生会这三个主体共同对网络舆情进行预警和管理。其次，高校要制定有关规章制度、奖罚条例、工作措施等，一旦发生舆情事件，可让网络舆情主体有章可循、有法可依。最后，管理者对舆情事件有制约性，舆情事件发生后，管理者应在第一时间出现，与事态同频，进行公开、公正、有效的信息沟通与权威信息发布，充分彰显高校公信力与管控力。有关研究表明，当高校做出积极正面回应后，高校负面网络舆情在高校师生群组中的传播逐渐转入淡化期的可能性较高，因此管理部门快速正确地回应高校网络舆情，能有效降低负面舆情带来的情绪发泄影响[37]。

（三）科学利用工具和大数据分析管理

高校舆情风险防范过程中除了对舆情的主体加强管理，利用好工具，结合机器语言对舆情情感倾向做及时监管和引导也是十分必要的。舆情事件的发生离不开网络平台，高校需借助网络舆情监测软件对线上的公共舆论平台进行实时监控。高校应建立危机信息监测机制，利用大数据监测系统，实现危机信息的实时搜集和分析，为科学制订危机形象修复方案提供决策参考[14]。高校可使用爬虫工具积累舆情语料，然后利用机器语言对评论做情感标引及打分，将舆情文本进行自然语言分析，选出高校网络舆情事件中的高频词、情绪词，把握舆情情感价值倾向，从而更迅速地提供预警信息[7,23]，减少负面舆情的影响效力。

（四）正确引导网络意见领袖的情感倾向

在信息传播过程中，网络意见领袖具有相对的独立性、号召力和凝聚力，他们的舆情情感倾向通过“粉丝”的转发将在网络中放大。在高校网络信息传播过程中，原始的信息植入网络意见领袖主观的观点、立场、态度、认知及偏见，会使其个人效应及影响力得到了前所未有的彰显，甚至影响舆情的演变。因此，对于高校而言，掌控舆情事件的关键节点，正确引导和培养网络意见领袖，使之成为主流声音，是高校网络舆情管控工作的重要部分。

在舆情风险防控运行过程中，要充分发挥院系辅导员的作用，利用辅导员特有的岗位职责和在舆情传播中的特殊位置，组建由辅导员和学生会共同参与引导的、积极向上的、拥有正确价值观取向的网络意见领袖团队，充分发挥其在舆情传播节点中的作用。另外，对已经存在的校园网络意见领袖要加强组织管控，充分尊重信任他们，引导他们在网络舆情的传播中发挥正向引领作用。

五、结语

青年是国家的希望，其正确的价值观取向关系着国家的发展。高校要充分发挥新媒体作用，弘扬社会主义主旋律，培养大学生的社会主义核心价值观。同时，高校要时刻关注跟踪高校舆情发生发展的全过程，建立起网络舆情危机防控管理机制，发挥网络意见领袖的正向引领作用，这样才能有利于

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

营造风清气正的校园环境，促进健康校园网络环境构建。

[参 考 文 献]

[1] 沈娟.高校网络舆情形成机理初探[J].科教文汇(中旬刊),2017(32):147-149.

[2] 习近平.高举中国特色社会主义伟大旗帜 为全面建设社会主义现代化国家而团结奋斗:在中国共产党第二十次全国代表大会上的报告[J].中国人大,2022(21):6-21.

[3] 孙旭红,顾琪.高校思想政治教育话语传播的现实挑战及优化策略:大学生网络圈群视角[J].高校教育管理,2023,17(2):35-43.

[4] 盖逸馨.讲好思政课,增强主流意识形态认同[N].光明日报,2023-01-17(02).

[5] 许烨婧.多媒体网络舆情信息的并发获取机理与话题衍进追踪研究[D].长春:吉林大学,2020.

[6] 王来华.舆情研究概论[M].天津:天津社会科学院出版社,2003.

[7] 符遥.大数据背景下的高校网络舆情全过程研究[J].新闻传播,2022(23):26-28.

[8] 陈璟浩,李纲.突发公共事件网络舆情在网络媒体中的传播过程[J].图书情报知识,2015(1):116-123.

[9] 王灵芝.高校学生网络舆情分析及引导机制研究[D].长沙:中南大学,2012.

[10] 汤力峰,赵昕丽.网络舆情与高校思想政治工作的应对[J].黑龙江高教研究,2007(4):64-65.

[11] 赵扬.高校网络舆情引导研究[D].长春:东北师范大学,2017.

[12] 赵中源,王国栋.高校网络舆情发展趋势及其治理机制[J].中国高等教育,2011(Z3):58-59.

[13] 李文军.大数据时代高校网络舆情管理机制研究[D].成都:电子科技大学,2021.

[14] 王哲,何飞.高校网络舆情危机演化及管理机制研究[J].西南民族大学学报(人文社会科学版),2022,43(8):157-162.

[15] 刘社欣,唐时娇.网络思想政治教育价值引领:群体极化的破解之道[J].理论导刊,2023(5):116-122.

[16] 彭国超,程晓.热点事件中社交媒体群体极化形成机理研究[J].信息资源管理学报,2023,13(2):42-52.

[17] 吴华.网络群体极化的意识形态效应及其治理[J].青海社会科学,2021(6):71-81.

[18] 中华人民共和国教育部.2021年全国教育事业发展统计公报[EB/OL].(2022-09-14)[2023-05-25]. http://www. moe. gov. cn/jyb_sjzl/sjzl_fztjgb/202209/t20220914_660850.html? eqid=a49a7c48-001b477700000006642d462e.

[19] 王宝林,宋莹.网络舆情对大学生树立及践行社会主义核心价值观的影响及优化路径分析[J].华北理工大学学报(社会科学版),2022,22(6):65-70.

[20] 梅科,陈倩.大学生网络舆情的新特点与引导策略[J].学校党建与思想教育,2023(8):22-25.

[21] 邢云菲,李玉海.高校网络舆情传播主题图谱可视化研究[J].情报科学,2020,38(11):86-91.

[22] 邢云菲,王晰巍.国外社交媒体中群体极化研究综述[J].情报科学,2022,40(9):176-184.

[23] 王晰巍,贾若男,韦雅楠,等.多维度社交网络舆情用户群体聚类分析方法研究[J].数据分析与知识发现,2021,5(6):25-35.

[24] 彭兰.从封闭的虚拟社区到开放的社会网络[EB/OL].(2009-11-25)[2023-05-26]. https://www.xwpx.com/article/2009/1125/article_5491.html.

[25] 余丽丽.网络社群的结构与行动机制探析[J].今传媒,2012,20(2):21-23.

[26] 马浩文.网络社群的空间隔阂机制:线上与线下、在场与缺场之间的交织[J].宜春学院学报,2023,45(1):32-35.

[27] 周升铭,王鹏.高校网络舆情的生成、传播与引导机制研究[J].学校党建与思想教育,2020(24):59-60.

[28] 于德山.共识与分歧:网络舆论的信息传播研究[M].北京:社会科学文献出版社,2016.

[29] 李纲,陈璟浩.突发公共事件网络舆情研究综述[J].图书情报知识,2014(2):111-119.

[30] 董裕雯.中国高校网络舆情的传播与应对策略研究[J].国际公关,2022(24):158-160.

[31] 赵芮.后真相时代高校网络舆情嬗变的成因与应对策略[J].浙江树人大学学报(人文社会科学),2021,21(3):92-98.

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

[32] 杨仲迎.高校网络舆情传播特点及管理对策[J].新闻战线,2017(17):124-126.
[33] 张雷,谭慧雯,张璇,等.基于LDA模型的高校师德舆情演化及路径传导研究[J].情报科学,2022,40(3):144-151.
[34] 黄苏芬,司雯,穆亭钰.自媒体时代高校网络舆情管控与引导机制创新研究[J].情报科学,2021,39(4):62-67.
[35] 李根强,方从慧.复杂网络视角下网络集群行为主体的观点演化研究[J].情报科学,2017,35(5):125-131.
[36] 胡剑锋,曾建龙.高校网络舆情传播特征及引导机制研究[J].新闻研究导刊,2022,13(7):40-42.
[37] 陈晓燕,何有世.新媒体环境下基于动机理论的高校负面网络舆情传播研究[J].高校教育管理,2020,14(6):105-116.
[38] 张瑞.习近平关于青年教育的重要论述研究[D].武汉:中国地质大学,2022.

[责任编辑:钟 岚]

(上接第7页)

(二)建议

1.由于本文研究样本数较少,研究范围仅集中于学院层面100余名硕士研究生,今后需扩大调查研究范围,并优化调查问卷题目。

2.教育部发布的《研究生导师指导行为准则》明确了研究生导师是研究生培养的第一责任人,因此需要进一步加强师资队伍建设,提升导师队伍实力,强化导师在招生宣传中的主体意识,鼓励更多导师参与研究生招生宣讲,提升招生宣传的实效。

3.围绕学科建设的发展目标,建优建强教学、科研和实验平台,确保在校生具备基本科研、实验要求的条件,形成良好的师生关系,助力高质量人才的培养。

[参 考 文 献]

[1] 丁悦,徐莉林,郭文瑞.西部地区农林高校硕士研究生生源状况分析与对策研究:以内蒙古农业大学为例[J].内蒙古农业大学学报(社会科学版),2023,25(1):30-37.
[2] 向芳,李凤杰,蒋龙,等."双一流"背景下地质类硕士研究生招生现状及启示[J].中国地质教育,2023,32(1):101-104.
[3] 靳慧,刘佳,曹兵.提高研究生招生宣传效力的思考:以北京化工大学为例[J].北京化工大学学报(社会科学版),2017(1):79-82.
[4] 马燕,张莉莉,邓丽姣.研究生导师指导满意度影响因素实证研究:基于SEM模型[J].重庆师范大学学报(社会科学版),2020(3):68-76.
[5] 杨烨军,李娜,王徐凯.研究生导师指导质量满意度影响因素分析[J].牡丹江师范学院学报(自然科学版),2021(4):71-76.
[6] 胡楠,李志.硕士研究生与导师沟通的现状及满意度影响因素研究[J].高教学刊,2022,8(25):57-60.
[7] 蓝文婷,罗建平.研究生教育的现状与问题研究:基于2021年全国研究生教育满意度调查的分析[J].研究生教育研究,2022(2):72-80.
[8] 周文辉,黄欢,刘俊起,等.2022年我国研究生满意度调查[J].学位与研究生教育,2022(8):21-27.

[责任编辑:林志恒]

(C)1994-2024 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

3.1.3.以通讯作者发表本专业论文情况

（1）理性网络信息观与信息传播自律



传媒论坛

Chuanmei Luntan

半月刊　　2024年9月下第18期　　第7卷　　总第162期

主管单位　江西日报社
主办单位　江西日报社
编辑出版　江西《传媒论坛》杂志社
国际标准连续出版物号　ISSN 2096-5079
国内统一连续出版物号　CN 36-1348/G2
邮发代号　44-111

主　　编　顾　强
编　　校　曾文斌　曾　军　吴　庄
　　刘淑敏　刘小红　王子涵（实习）
　　邹　玲（实习）
行政人员　陈　凌
联系电话　0791-86847101　0791-86847262
　　0791-86849252
邮　　箱　cmltbjb@163.com
联系地址　江西省南昌市红谷中大道1326号
　　江西日报社《传媒论坛》编辑部
邮　　编　330038
出版日期　2024年9月25日
杂志定价　15.00元
印刷单位　江西千叶彩印有限公司
法律顾问　江西法报律师事务所　杨峻
国内发行　江西省报刊发行局
订　　阅　全国各地邮局

本刊声明

除非本刊特别声明，本刊所载的所有文章均不代表本刊编辑部观点，作者文图责任自负。如有侵犯他人版权或者其他权利的行为，本刊概不负连带责任。

本刊已许可中国知网等包括但不限于数字化汇编、数字化复制、数字化制品形式（包括光盘、互联网出版物）发行、信息网络传播、翻译、改编等合理使用本刊全文。本刊支付的稿酬已包含中国知网等著作权使用费，所有署名作者向本刊提交文章发表之行为视为同意上述声明。如有异议，请在投稿时说明，本刊将按作者说明处理。

目次

◇专题｜共情传播研究

共情传播的前提与进路 ……王卫明（003）
共情传播视域下微短剧中女性形象建构研究
……成　璐　邵　璐（004）
县级融媒体中心主持人共情传播策略分析
……祝　赫　郭婧文（007）
从情动到倦怠
——体育短视频中的共情传播研究 …韦文璐　宋志超（010）
共情传播视域下文旅综艺发展与传播策略研究
——以《跳进地理书的旅行（第二季）》为例
……蒋天爱　刘英杰（014）

◇红色传播

人民抗日剧社宣传动员工作的开展及当代启示
……黄兴文　范连生（017）
从救亡歌曲看中国红色音乐文化的历史意义和价值
……何至豪（021）

◇传媒观察

感知收益和感知风险对计算广告用户态度的影响：
隐私关注的中介作用 ……林升梁　李倍源（026）
理性网络信息观与信息传播自律 ……严一梅　刘　洋（032）
热领域的浅思考
——探析直播带货的发展与转型 ……王　瑞　刘　娅（037）
二次创作短视频的参与式文化研究 ……徐珍妮（042）
数字政府回应对政务舆情影响效果研究
——基于30起案例的模糊集定性比较分析
……王　娜　祁　凯（045）
高校突发公共事件预警系统研究 ……李　慧　陈怡君（048）
穿梭的单向度景观：城市航拍短视频的视觉文化特征探究
……左洪图　林　文（053）


传统
重阳节
中/国/传/统/节/日
地　址：江西省南昌市红谷中大道1326号
邮　编：330038
征稿信箱：cmltbjb@163.com
ISSN 2096-5079
18>
9 772096 507244
定价：15.00元

理性网络信息观与信息传播自律

严一梅 刘 洋

摘 要:互联网及新媒体技术拓宽了现实社会的时空边界,给人们的生产生活带来便捷与高效的同时,也因信息多元混杂,给现实社会增加了不确定干预。以微信信息分享为例,建立信息扩散行为模型,讨论群间信息遍历的条件、范围、扩散速度及其影响因子,并提出引导网民理性约束信息响应行为的网络信息评估及传播自律建议,对于提高网民理性信息认知能力与加强传播自律意识的建设有一定参考应用价值。

关键词:信息认知;传播自律;理性信息观

随着互联网技术的迅速普及应用,人们越来越依赖通过网络获取信息,网络社会成为现实社会的延伸。作为信息活动主体的人,左右着网络信息生态,同时也被网络信息生态所左右。营造一个健康的互联网信息生态,必然会助力现实社会生态向好,而健康的信息生态系统应该呈现并维持信息活跃。如今,移动互联网技术和智能手机的快速普及,使得网络信息活动向着大众化、多元化方向发展,为百花齐放的信息繁荣创造了理想环境与技术支持平台。然而,现实社会的复杂性必然会传递到信息社会的场景中。鉴于互联网信息传播迅速,而信息管控措施逻辑上滞后,网络信息的混杂在所难免,网络用户必须具备“吸取精华,剔除糟粕”的信息辨识能力。因此,探索简单、易实施的教育引导方式和实践养成方法,潜移默化训练和提升网民理性信息观,具有现实意义和研究价值。本文拟从多视角探讨营造适度宽松、多元多样网络信息活力的必要性,以及提高网民理性认知网络信息能力的可行性。

一、网络信息多元化是信息生态健康的必要条件

如同生物多样性是自然界生态健康的标志一样,多样性和多元化也是网络信息生态健康的必要条件。只有营造“百花齐放,百家争鸣”的氛围,才有“推陈出新,优胜劣汰”的活力,进而才有信息服务向好进化的欣欣向荣。

(一)互联网技术进步成就网络信息多元化

互联网尤其是移动接入技术的进步和智能手机普及应用,使信息界由传统媒体独大快速进入“全民媒体”时代。其中,新媒体可以看作一个“混合媒介系统”[1]。社会信息的输入源不再只是统一出版的各种报纸、按时播放的新闻、集体收视的节目、选择有限的文章,不再线性化、结构化存在,而是统一被人手一个、无时无刻不在线的智能终端所“解构”[2],使个人一己之力带动一波舆论节奏成为可能。

新媒体时代的信息系统更能满足人们日益增长的信息需求,是现代通信技术进步的必然产物。其中,传统媒体与时俱进,线上线下依然保持面向公众的主流媒体角色。互联网赋能的双向信息沟通平台和通道,使得人人都能成为媒体人。传统媒体的单向串行信息生产和流动,容易从“编辑部”职能环节施加影响归化舆论口径,并且这种管控是超前的;而新媒体中的双向并行信息流动是快捷秒传的,网络信息的管控是滞后的。正是这种“媒体大

作者简介:严一梅,华南农业大学图书馆副研究馆员;刘洋(通讯作者),华南农业大学图书馆馆员。

基金项目:广东省普通高校青年创新人才项目“新时期网络舆情对大学生情感取向演化的模型研究”(项目编号:2020WQNCX007)研究成果之一。

中国知网 https://www.cnki.net

众化+监管滞后”特性，助推着网络信息多元化。

（二）多元信息活力促进社会生态向好

信息“多元”与“多样”语义常被混淆使用。其实，信息多样性一般指信息的种类与形式上的多样，如文字、图片、音频、视频等不同类型的信息，以及同一信息的不同表达方式，主要侧重于信息载体与表现形式的多样，以满足人们不同的信息接受习惯与偏好。信息多样性有助于将信息传递给更广大受众，实现最大范围内的信息传播效果。但信息多样性不一定意味着信息内容或观点的多元。信息多元指的是信息的内容、观点与价值判断上的多元，代表不同的思想、意识形态或文化立场，强调提供真实反映社会认知状态的信息广度与深度。互联网及其新媒体技术为信息多样性和多元化提供了理想表达渠道和行为平台，推动社会进入信息丰富与信息开放状态，有助于将公众的知情权、参政权和言论自由权落到实处。

网络社会是现实社会的延伸。网络信息的多元活力，促使社会治理模式由单向管理转向双向互动，助推社会治理现代。一方面，能整合政府核心资源服务群众信息需求，实现政务公开、信息公开，提高办事效率，将公民的知情权、参与权、表达权落到实处；另一方面，无处不在的网络监督，会随时随地记录并公开社会上的不法行为，在无形中约束了人们的行为规范，促进社会生态向好。

二、多元信息环境下的理性信息观

多元的互联网信息有正常信息，也有虚假信息。其中的谣言等有害信息往往伪装成正常信息，似是而非，真假难辨。公众期望得到正常信息服务，但若信息辨识意识欠缺，得到的可能是信息伤害。

（一）多元信息氛围中的信息认知挑战

互联网中的有害信息为了躲过网络信息监管的拦截，竭力伪装成正常信息，两者持续上演着“道高一尺，魔高一丈”的战术博弈。随着机器学习技术的进步，监管方引入AI技术提升信息内容辨识的效率和准确性；有害信息制造方则利用AI技术让谣言的伪装乱真[3]。例如，生产以假乱真的文字新闻与评论或者对图片、声音、视频等各种媒介类型进行深度伪造。这些人工智能技术的普及化发展，正在颠覆人们“眼见为实”的生理信念。

存在竞争关系的各方会在相互博弈中获得能力进化，而博弈中的网络监管和有害信息亦如此。显然，有害信息的进化对普通网民而言是灾难性的，是对网络信息认知能力的严峻挑战。

（二）信息认知的感性与理性

大脑对外部信息激励的行为响应可以分为两个层面，一是本能主导的直接行为，二是思维主导的后续行为。本能源自生物进化，思维则是无数个神经元在生命适应环境历程中形成的复杂组织的联动。对于信息认知，有将其看成对信息加工的两个层次：启发式（heuristic）和分析式（analytic）[4]。启发式加工主要依赖直觉完成，人们通常只能意识到其加工结果而意识不到加工过程，调用的认知资源较少；分析式加工是相对深层且更精细化的加工方式，需要对信息和情境作出全面理解和评估后才能形成加工结果，调用的认知资源较多[5]。信息认知过程可以分为感性认知和理性认知。卡尼曼（Daniel kahneman）将人类认知系统诠释为感性认知系统和理性认知系统：感性认知系统表现为快速、自动、无意识、并行、不作努力、联想、慢速习得；理性认知系统，表现为慢速、受控、有意识、串行、付诸努力、规则支配、相对柔性且具有中立性。前者是一种启发式判断[6]，而后者才是深思熟虑的判断，兼具监控心理活动和外部行为并对其进行修正的功能[7]。

“走捷径，避阻力”是自然界所有物质运动的动力学本能。人脑思维活动亦如此。认知心理学抑或认知科学关心人类心智的无意识过程，这一过程正是非理性的[8]。面对海量的互联网信息，本能触发的是快捷的感性认知系统。若仅凭“直觉”替代形式推理，并用所获结论指导信息响应行为，极有可能误入信息攻击者精心布置的思维陷阱，导致错判误动，给自己和他人带来伤害。所以，面对互联网的多元混杂信息，自觉克服只走认知捷径的思维惰性，建立理性信息观至关重要。

三、理性信息认知的信息传播自律

新媒体时代，信息受众通过不断自我赋权并扩张，其发表意见和传播信息的自主权获得空前发展[9]。新媒体传播既是多元信息活力的源泉，也给虚假信息扩散带来方便。为阻止信息伤害扩大化，提高信息受众的理性信息认知能力和建立信息传播自律意识，或成为技术监管逻辑滞后情况下最后的现实依靠。

（一）新媒体场景下的信息传播特点

互联网信息的生命周期涉及的主要环节或角色包括

中国知网 https://www.cnki.net

信息生产者、传播者、受众和分解者。其中,信息受众是可塑角色。其信息认知会导致其角色转换。若对信息认同并转发,则成为传播者;若洞察破绽并公开质疑,可能成为分解者。显然,提高信息受众对虚假信息的辨识能力,抑制角色误向转换,是抑制有害信息迅速传播与扩散,加快其分解的关键。下面分析新媒体用户个体间信息传播特性,以明确控制要素。

与传统媒体的传播模式不同,新媒体用户可以依照自己的需要、喜好,建立异构化的信息渠道与媒介使用时空。由于互联网信息时空是“无界”的,而用户个体的信息时空是有限的,面对海量的互联网信息,用户通过新媒体资源的“自我配置”[10],满足个体信息需求。尽管个人信息时空区的配置各异,范围不同,但信息在个体间遍历仍然是可能的。因为这些区域最终会形成“蜂窝”互联。以智能手机用户最常见的资源配置习惯为例,其信息时空区主要由其注册的微信号、公众号、介入的微信群、朋友圈、关注的公众号和网站等组成。为简化讨论并不失一般性,这里仅以微信群为论域,讨论信息遍历的条件、范围、扩散速度及其影响因子。

设每个智能手机用户注册至少一个赋权微信号,加入平均G个微信群,每群平均有M个成员,其中有M_k个成员会向G_p个群转发信息,这里有$M_k \leqslant M, G_p \leqslant G$。设用户$A_0$在$t_0$时刻发起一次信息分享,向直接关联的G个微信群中的$G_p$个群“灌水”(发信息),定义该行为为以节点$A_0$为中心的第n(n=1)波次信息扩散。设扩散范围为$S_n$(人),则有:

$$S_{n_{n-1}}=MG_p$$

设信息传递的平均网络时延为t_{net},信息受众启动阅读时延为t_q,阅读耗时为t_r,形成转发决策时延为t_c,则发起新一波次信息扩散间隔时间T为:

$$T=t_{net}+t_a+t_r+t_c$$

扩散范围增加为:

$$S_{n(n-2)}=MG_p+MM_kG_p^2$$

设在该信息生命周期结束(被分解)前,信息有时间扩散n波次,对应的扩散范围为:

$$S_n=MG_p+MM_kG_p^2+MM_k^2G_p^3+\cdots+MM_k^{n-1}G_p^n$$

$$=MG_p(1+M_kG_p+M_k^2G_p^2+\cdots+M_k^{n-1}G_p^{n-1})$$

设$M_kG_p \neq 1$,对上式中的等比数列求和得:

$$S_n=\frac{MG_p\left[(M_kG_p)^{n-1}-1\right]}{M_kG_p-1} \quad (1)$$

扩散所需时间T_n为

$$T_n=nT=n(t_{net}+t_a+t_r+t_c) \quad (2)$$

若用户A不慎转发了有害信息,由式(1)和式(2)知,灌水群数G_p和每群转发人数M_k越大,信息扩散范围越广。而信息分解时间拖延越久,信息转发波次n值就越大,信息扩散范围将呈几何级数增加。所以,抑制有害信息扩散,一是尽快澄清事实,加快其分解;二是培养网民良莠信息鉴别意识和理性认知能力,以减少有害信息转发人数、灌群个数。若能发现破绽,公开质疑,则有助于加速有害信息的消亡。

(二)理性信息认知与个体传播自律的训练方式

受众个体节点的信息响应行为,会在传播链中形成“蝴蝶效应”,在行使言论自由权力的同时,也必须承担维护社会秩序、抑制有害信息扩散的义务。这里探讨一种理性信息认知与个体传播自律的自主训练方法—信息辨识与响应的“三步评估法”,以帮助用户理性决策信息响应行为。“三步评估法”执行流程如图1所示,各环节的主要评估要素详见表1。

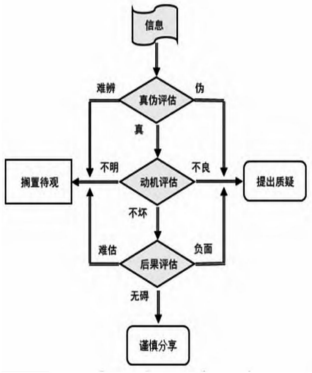


图1 信息认知路径的三步评估法

(三)三步评估法的要素机理

对网络信息的三步评估也是三个层次的研判:即信息内容的真伪评估、信息背后的动机评估和信息扩散的后果评估。尽管受到个体知识面有限的制约,难以保证每个评估环节结论都准确。但只要有信息研判意识,能按评估的“模糊”结论决策信息响应比轻信要理性很多。其准

中国知网 https://www.cnki.net

表1 主要评估要素

	真伪评估	动机评估	后果评估
①	场景破绽	潜在受益者	引起恐慌
②	情理破绽	可能受损方	激化社会矛盾
③	逻辑破绽	政治目的	国安风险
④	信源及信源间内容偏差	诱导偏见	助长歪风邪气
⑤	对事件解读的主、客观性	诱导犯法	行政受阻

确度会随着实践经验的积累逐步提高。

1.信息内容的真伪评估

宣称是事实,实则为造假的信息,是信息采信时的一票否决条件。虚假信息主要类型有虚假事件、嫁接事实、真事件假“解读”等。表1中列出5个识别要素供参考。其中,要素④从信息来源视角识别,通常主流媒体的可信度高于自媒体,因为前者有“编辑部”环节信誉把关,后者则是信息个体发布的“仅代表个人观点,不代表平台立场”的言论;众多信源报道的信息可信度高于稀少信源报道的。如果信源间内容存在偏差,则可信度需进一步研判。对突发事件的报道,其解读部分亦有真伪之别,通常客观评论可信度高于主观评论可信度。

2.信息背后的动机评估

对信息制造者的动机研判,有助于发现信息背后真正的利益算计和因果逻辑。是信息评估的深层次。

3.信息扩散的后果评估

后果评估是把个人信息行为主动与社会责任和国家全局意识相关联的高层次评估。表中所列的“行政受阻”项是指是否妨碍良策善政。每当出现突发性公共事件、局部矛盾以及政府政策调整和变动时,往往会出现谣言淹没真相、舆情汹涌的现象。除了敌对势力兴风作浪外,许多网民也会从众跟风。由于个人的眼界、理智和立场常受

表2 三步评估法应用示例

序号	案例	真伪评估	动机评估	后果评估	处理	备注
1	2022年4月,评“英国《每日邮报》关于新冠病毒基因中含有美国莫得纳公司2016年申请专利的基因片段”的报道,由此倾向认定是美国制造泄露。	真假难辨/查阅相关报道,认为尚无足够证据说明就是莫得纳公司创造,也无足够证据能让莫得纳摆脱嫌疑。	表达严重质疑美国的观点。	形成声讨美国生物实验室的舆论风暴。	不转发	理由欠充分。
2	中国日报网2023年7月24日8:36分:7月23日14时56分,齐齐哈尔体育馆坍塌事故已致10人死亡,尚有1人被困。施工单位违规将珍珠岩堆置体育馆屋顶。雨水增重,导致屋顶荷载增大引发坍塌。深入调查仍在进行中。	真/官媒信源。	及时公布突发事件及调查进程。满足公民知情权。	压缩传言泛滥空间。	可转	主流媒体据实报道,对突发事件应对正确,反应及时。
3	2023年3月21日,有人在互联网晒出美国前总统特朗普监狱服刑的“照片”。	假/场景逼真,但逻辑破绽。曼哈顿刑事法院法庭对特朗普的传讯要到4月4日才开始。	用AI作品调侃政治人物。炫耀技能,博人眼球。	对美国政治氛围而言,无大碍。	可转	领略AI的乱真水平。
4	2023年3月10日,互联网流传一房屋废墟视频,称四川广安市发生9.8级地震。经公安部门介入调查,系一名男子醉酒后在自家拆迁房屋废墟现场拍摄视频,谎称“广安遭了大地震,房屋都倒塌了90%”。	假/场景难辨,但有情理破绽。如此重量级的突发事件当有官方媒体及时报道。	编造骇人听闻博人眼球,刷存在感。	提醒网民有“什么都敢编”的造谣者,我们不能“什么都敢信”。	可转发	谣言越恶,越容易触发官方介入调查,促成快速消解。
5	袁雪梅古筝表演/抖音娱乐等视频。	真/无场景破绽等。	分享技艺的同时,赚取流量	愉悦身心,提高艺术修养	转发给箏友鉴赏	动机在理。可在同道间交流。
6	中国将全面禁止进口奶粉。	假/对人大代表建议断章取义。	跨境电商和海淘者广告嫌疑;制造恐慌以利营销。	海淘奶粉质量良莠不齐,严重影响了婴幼儿的发育健康。	不转发	造假,一票否决。

中国知网 https://www.cnki.net

自己切身利益的制约,而不同的人群有不同的利益,这些私人或小群体的切身利益并不会天然和国家长远利益完全吻合[11]。政府出台政策,通常是经过多方论证,顾全大局照顾大多数人长远利益的。如果有损眼前利益,带来某些不便,也是多项损害取其轻的。如果确有设计缺陷,可以谏言献策,甚至抱怨吐槽,确保社会反馈通道畅通以助力修正完善,但要与攻击抹黑相区别。对于煽动抵触情绪的言论,要多一份冷静,理性评估信息扩散是否对政策实施与完善造成不当阻力。

(四)三步评估法的应用

为说明“三步评估法”应用原理,笔者从近年来网络出现的多元信息中随机抽取若干案例为示范样本,按图1的信息认知路径、表1的评估要素进行研判,据此决定信息响应“行为”。模拟实施过程及结果如表2所示。

通常信息内容的真伪评估难度较大,若一时找不出破绽,可直接进入后续评估环节,相对容易发现端倪。需要说明的是,根据研判选择何种信息响应行为,决定因素不只是信息评估本身,还包括评估者的社会责任意识。所以,三步评估法的有效前提,是信息受众必须具备基本端正的立场。另外,受个体知识面或知识水平有限制约,个别环节的评估结果未必正确,但由于各环节间有相互印证的潜在逻辑关联,实践中若能领悟到这一点,可以减少整体评估出错的概率。其实,只要建立“互联网信息未必都是真的,未必都是正确的”质疑意识,稍具“听话听音,锣鼓听声”的基本能力,克服仅凭直觉和一己好恶轻率作出决策的认知思维惰性,将“三步评估法”用于信息认知实践并非难事。若养成习惯,信息认知层次自然会升级到理性境界。

四、结语

基于互联网的新媒体技术普及应用,现实社会开始向网络信息社会延伸,便捷的信息沟通,全方位提升了人们社会生产活动方方面面的质量和效率。同样地,也为我们建设社会主义民主政治提供了理想的信息渠道与表达平台。为把“还权于民”(知情权、参与权、表达权、监督权、选举权和生存权)落到实处、保持社会生态总体向好,营造互联网信息多样性与多元氛围成为网管策略必须遵循的重要原则。由于现实社会的复杂性,宽松的互联网信息平台难免会有“杂音共存”问题,信息受众在获得开放信息好处的同时,也会遭遇“漏网”的有害信息的滋扰。为削弱其对现实社会造成的伤害,提高网民不良信息免疫力成为最后也是最根本的防线。学界已有的共识是:信息素养与信息认知免疫力正相关;提高知识水平是提升信息素养的基础;获取足够的知识并逐步体系化,才能有更多思考的可能性,为此,需要做一个终身学习的人。但就个体而言,这需要相当厚重的时空沉淀,并且社会分工不同,学历、专业各异,网民存在知识差异是客观事实。面对多样多元、瞬息万变、良莠并存的互联网信息,理性信息观建设是必需的,也是可行可期的。

参考文献:

[1]CHADWICK A. The Hybrid Media System:Politics and Power[M]. Oxford:Oxford U,2017:33-34.

[2]喻国明,曲慧,方可人.重新理解媒介:以受众“媒介观”为中心的范式转换[J].新疆师范大学学报(哲学社会科学版),2021(3):111-119.

[3]汤景泰.网络生态乱象的新动态与应对[J].人民论坛,2022(22):108-111.

[4]EVANS J S. B.In Two Minds:Dual-Process Accounts of Reasoning[J].Trends in Cognitive Sciences,2003(10):454-459.

[5]喻国明,刘彧晗.认知带宽:个性化传播时代用户洞察的新范畴[J].社会科学辑刊,2023(3):213-219.

[6]TVERSKY A, KAHNEMAN D, SLOVIC P. Judgment under uncertainty: Heuristics and biases[M]. Cambridge University Press,1982.

[7][8]谢澍.“认知交互”与“偏见阻断”—刑事庭审实质化的理性认知进路[J].当代法学,2023(1):135-148.

[9]张潇.受众自我赋权扩张与手机传播自律[J].中国报业,2014(20):25-26.

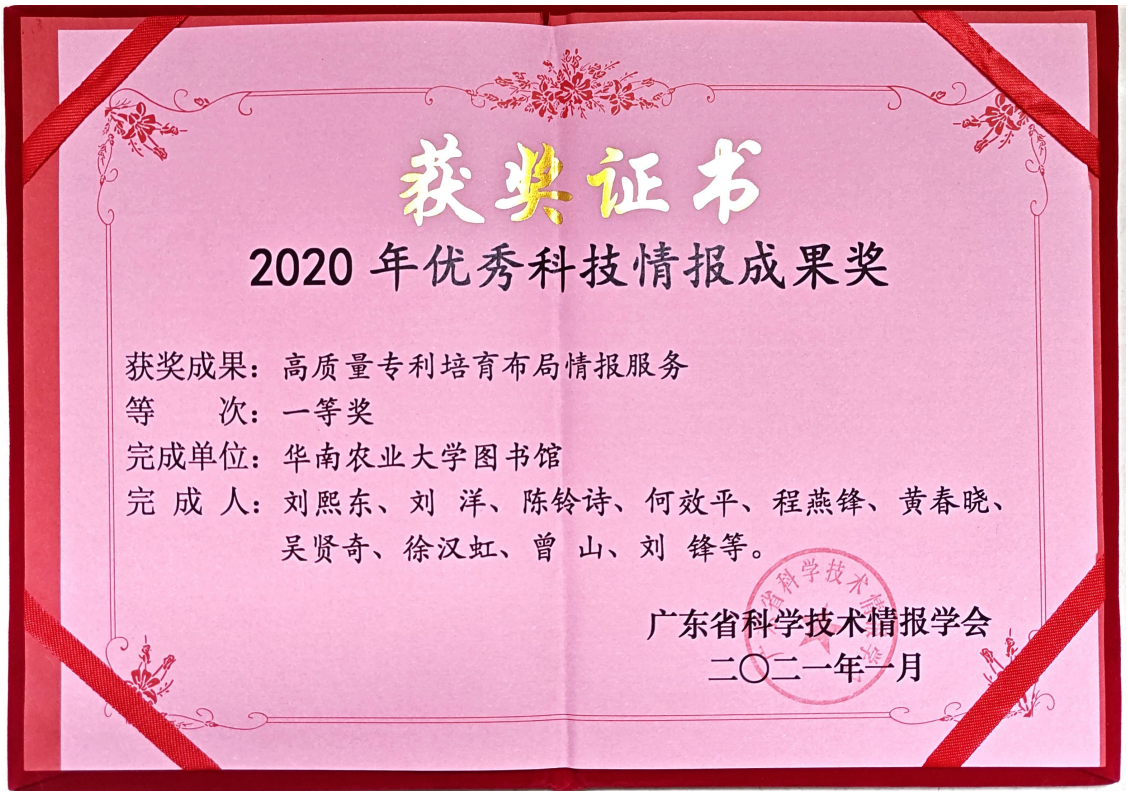
[10]马克·格雷厄姆,威廉·H·达顿.另一个地球:互联网+社会[M].胡泳,徐嫩羽,等译.北京:电子工业出版社,2015.

[11]张维为,范勇鹏.《这就是中国》第174期:中国民主的优势在哪里[EB/OL].(2023-02-12)[2024-08-29].http://www.guancha.cn/ZhangWeiWei/2023_02_12_679504_2.shtml.

中国知网 https://www.cnki.net

3.2 科技奖励

3.2.1 2020 年优秀科技情报成果奖



获奖证书

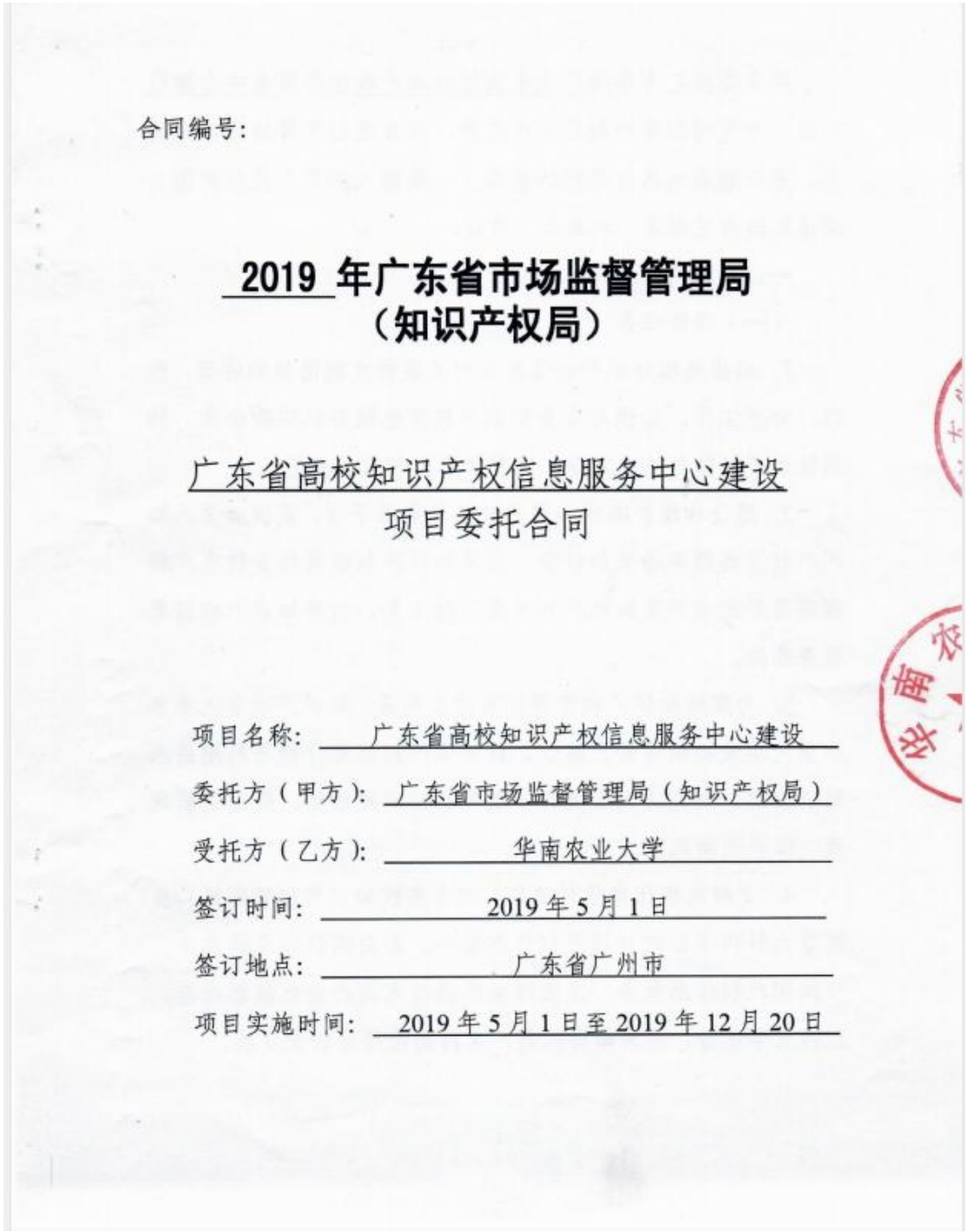
2020 年优秀科技情报成果奖

获奖成果：高质量专利培育布局情报服务
等　　次：一等奖
完成单位：华南农业大学图书馆
完 成 人：刘熙东、刘　洋、陈铃诗、何效平、程燕锋、黄春晓、吴贤奇、徐汉虹、曾　山、刘　锋等。

广东省科学技术情报学会
二〇二一年一月

3.3 科研平台

3.3.1 广东省高校知识产权信息服务中心建设项目



合同编号:

2019 年广东省市场监督管理局
（知识产权局）

广东省高校知识产权信息服务中心建设
项目委托合同

项目名称: 广东省高校知识产权信息服务中心建设

委托方（甲方）: 广东省市场监督管理局（知识产权局）

受托方（乙方）: 华南农业大学

签订时间: 2019 年 5 月 1 日

签订地点: 广东省广州市

项目实施时间: 2019 年 5 月 1 日至 2019 年 12 月 20 日

甲方委托乙方实施广东省高校知识产权信息服务中心建设项目，并支付相应的项目工作经费。双方经过平等协商，在真实、充分地表达各自意愿的基础上，根据《中华人民共和国合同法》的有关规定，达成如下协议。

一、项目内容

（一）项目任务

1. 承担高校知识产权信息及相关数据文献情报的收集、整理、分析工作，加强与专业知识产权信息服务机构的合作，畅通知识产权信息资源渠道，完善知识产权数据资源。

2. 建设和维护高校知识产权信息资源平台，提供必要的知识产权信息服务场所和设备，应用知识产权信息相关技术，根据需要引进或开发知识产权信息分析工具，改善知识产权信息服务条件。

3. 为高校知识产权管理体系建立完善、知识产权重大事务和重大决策提供咨询、建议，将知识产权信息分析与利用嵌入科研立项、研发决策全流程，服务高校研发活动，提高创新起点、降低创新风险。

4. 支持高校优势学科建设，配合高校知识产权管理机构提供重大科研项目的知识产权信息服务。面向高校师生提供全方位知识产权信息服务，方便师生掌握技术及产业化最新动态，把握竞争优势、寻求市场机遇，支持高校师生创业发展。

（二）工作目标

通过项目实施，支持高校建设完善高校知识产权信息服务中心，充分开展知识产权信息服务和人才培养工作，为高校知识产权的创造、运用、保护和管理提供全流程的服务，支撑高校协同创新和优势学科建设，促进高校科技成果转化。

（三）工作要求

1. 高校知识产权信息中心一般设立在高校图书馆。所在高校是知识产权信息中心的建设单位，负责建立健全知识产权信息中心的管理机构，配备专职人员，制定日常管理办法，负责相关基础设施建设及条件保障。

2. 乙方在项目实施期限内严格按照本合同约定的工作进度有序推进项目实施，确保本合同确定的各项工作任务如期完成。严格按照省财政有关规定使用项目资金，专款专用，并配合甲方开展检查验收、绩效评价、审计等相关工作。乙方在项目完成后要按照合同约定提交各类项目实施有关材料。

（四）工作进度：

序号	时间安排	工作内容
1	2019年5月—6月	建立工作团队：从科技查新及学科服务等人员遴选，组建项目团队
2	2019年5月—11月	数据库资源建设：引进专利数据信息与分析平台/数据库1—2个，夯实知识产权信息服务基础

3	2019年5月—11月	规范中心管理：调研兄弟高校知识产权信息服务中心建设情况，完善中心管理规章制度
4	2019年5月—12月	开展知识产权信息培训：举办专利培训/讲座4—8场，培育师生知识产权意识；参与人才培养，提高师生专利信息利用能力
5	2019年6月—11月	改善服务条件：提供必要的服务场所及设备，改善信息服务条件
6	2019年6月—12月	嵌入学校知识产权体系：与学校管理部门沟通，建立工作联系机制，掌握知识产权信息服务需求，提供知识产权咨询建议，提供学校专利分析与决策建议报告1份
7	2019年6月—11月	培养人才队伍：选派知识产权服务人员参加培训、会议，加强学术交流活动，提高服务水平
8	2019年5月—11月	支持学科建设：完成重要研究成果知识产权分析评议报告1—2份
9	2019年6月—11月	服务地方产业经济发展：为优势学科领域提供专利分析导航报告1—2份
10	2019年12月	工作总结，准备项目结题材料

（五）项目完成时间：2019 年 12 月 20 日。

（六）项目组成员

项目团队	姓名	性别	年龄	单位及职务	职称	学历	本项目任务分工
项目负责人	刘锋	男	51	华南农业大学图书馆/馆长	图书馆学/副研究馆员	学士	负责组织管理
	刘熙东	男	45	华南农业大学知识产权信息服务中心/副主任	农产品加工及贮藏工程/馆员	硕士	项目指导、项目组织、项目实施
	何效平	女	45	华南农业大学知识产权信息服务中心	汽车运用工程/讲师	硕士	服务组织、项目实施
	刘洋	女	30	华南农业大学知识产权信息服务中心	经济金融学/馆员	硕士	培训组织、项目实施

项目主要参与实施人员	陈铃诗	女	31	华南农业大学知识产权信息服务中心	教育管理/助理馆员	硕士	制度建设组织、项目实施
	姚红兵	女	53	华南农业大学图书馆/副馆长	机械设计与制造/副研究馆员	学士	组织协调
	吴贤奇	男	46	华南农业大学图书馆信息咨询部/部长	信息管理/副研究馆员	硕士	组织协调
	王中海	男	39	华南农业大学资源建设部/部长	信息管理/副研究馆员	硕士	数据库建设
	陈志鸿	男	40	华南农业大学科技处知识产权科/科长	农业推广/科长	硕士	知识产权管理体系建设
	刘毅新	女	38	华南农业大学科技处知识产权科	农产品加工及贮藏工程	硕士	知识产权管理体系建设
	卢炳卫	男	39	华南农业大学图书馆信息咨询部/副部长	图书馆学/馆员	硕士	项目实施，专利检索
	张琴	女	39	华南农业大学图书馆信息咨询部/副部长	基础兽医与临床兽医学/馆员	博士	项目实施，专利查新
	欧群	女		华南农业大学图书馆信息咨询部	图书馆学/副研究馆员	硕士	项目实施，专利培训
	曹燕	女	48	华南农业大学图书馆信息咨询部	作物遗传育种/副研究馆员	硕士	项目实施，专利查新
	程燕锋	女	38	华南农业大学图书馆信息咨询部	农产品加工及贮藏工程/副研究馆员	硕士	项目实施，专利分析
	陈建红	女	38	华南农业大学图书馆信息咨询部	植物学/副研究馆员	硕士	项目实施，专利分析
	潘科	女	41	华南农业大学图书馆信息咨询部	农业昆虫与害虫防治/馆员	硕士	项目实施，专利分析
	邓智心	女	46	华南农业大学图书馆信息咨询部	农业生态学/馆员	硕士	项目实施，专利培训
	韩明明	男	38	华南农业大学图书馆阅读推广部	信息管理/馆员	硕士	项目实施，信息可视化

二、合同金额及支付方式

本项目工作经费为人民币肆拾万元（￥40,0000元）。

付款方式：包括电汇或其它快捷方式，相关的账户信息为：

拨付资金账户：华南农业大学

时该会现行有效的仲裁规则进行仲裁。

十、其他

双方均应负协议的法律责任，不应受机构、人事变动的影响。

此合同自双方签字盖章之日起生效，至双方权利义务履行完毕时终止。本合同未尽事宜，双方在互惠平等的基础上协商解决并签订补充协议。

甲方联系人：陈彬彬，电话：020-38835358，邮箱：clark8321@hotmail.com。

乙方联系人：刘熙东，电话：020-85288065，手机：13602464545，邮箱：liuxidong@scau.edu.cn。

本合同一式6份，甲乙双方各持3份。

甲方（盖章）：
广东省市场监督管理局
（知识产权局）

代表人（签章）：
2019年5月1日

乙方（盖章）：
华南农业大学

代表人（签章）：
2019年5月1日



中华人民共和国中央人民政府
www.gov.cn

首页 | 简 | 繁 | EN | 登录 | 邮箱 | 无障碍

首页 > 政策 > 国务院政策文件库 > 国务院部门文件 字号：默认 大 超大 | 打印 收藏 留言

标　题：国家知识产权局办公室 教育部办公厅关于公布第二批高校国家知识产权信息服务中心名单的通知	发文机关：国家知识产权局办公室 教育部办公厅
发文字号：国知办发服字〔2020〕29号	来　源：知识产权局网站
主题分类：科技、教育\知识产权	公文种类：通知
成文日期：2020年07月06日	

国家知识产权局办公室 教育部办公厅关于公布第二批高校国家知识产权信息服务中心名单的通知

国知办发服字〔2020〕29号

各省、自治区、直辖市及新疆生产建设兵团知识产权局、教育厅（教委）、教育局，教育部直属各高等学校，其他部门所属各高等学校：

为贯彻中央办公厅、国务院办公厅《关于强化知识产权保护的意见》，落实《国家知识产权局关于新形势下加快建设知识产权信息公共服务体系的若干意见》、《教育部 国家知识产权局 科技部关于提升高等学校专利质量促进转化运用的若干意见》的工作部署，完善全国知识产权信息公共服务网点建设，增强高校在知识产权创造、运用、保护、管理和服务全链条的信息公共服务能力，根据《高校知识产权信息服务中心建设实施办法》，国家知识产权局、教育部联合开展了第二批高校国家知识产权信息服务中心遴选工作。经自主申报、初步筛选、专家初评、复评答辩、名单公示等环节，确定北京工业大学等第二批37家高校国家知识产权信息服务中心，现将名单公布。

相关省（区、市）知识产权局、教育行政部门要结合本地区实际，对高校国家知识产权信息服务中心在业务工作开展、信息资源建设、相关人才培养、服务地方经济产业等方面加强指导和支持。高校国家知识产权信息服务中心要充分发挥高校信息资源和人才资源优势，为知识产权创造、运用、保护、管理和服务提供全流程信息服务，不断完善知识产权信息公共服务体系，丰富知识产权信息服务内容，促进高校协同创新和科技成果转移转化，支撑国家创新驱动发展战略和知识产权强国战略。

特此通知。

附件：第二批高校国家知识产权信息服务中心名单

国家知识产权局办公室　教育部办公厅

2020年7月6日

新闻链接：国家知识产权局办公室 教育部办公厅关于公布第二批高校国家知识产权信息服务中心名单的通知_国务院部门文件_中国政府网（www.gov.cn）

附件

第二批高校国家知识产权信息服务中心名单

（按照拼音首字母排序，排名不分先后）

北京工业大学
北京化工大学
北京理工大学
北京中医药大学
东南大学
福州大学
复旦大学
贵州医科大学
河南大学
湖南大学
华北电力大学
华东理工大学
华南农业大学
江南大学
江苏科技大学
南昌大学
南京大学

3.3.2 广州市知识产权公共服务运行项目

2024 年度
广州市知识产权专项资金申报书

项目名称：知识产权公共服务项目

□知识产权信息公共服务网点建设运行项目

申报单位：华南农业大学（盖章）

组织单位：天河区市场监督管理局（知识产权局）

申报时间：2023.10.20

广州市市场监督管理局 编制

网点机构类别	☑ 高校类服务网点 □ 科研院所、科技情报机构类服务网点 □ 公共图书馆类服务网点 □ 经济技术开发区、高新技术产业开发区、产业园区生产力促进机构类服务网点 □ 行业组织类服务网点 □ 市场化服务机构类服务网点
网点机构已获资质	□ 技术与创新支持中心（TISC） ☑ 高校国家知识产权信息服务中心 □ 国家知识产权信息公共服务网点 ☑ 省级知识产权信息公共服务网点 ☑ 市级知识产权信息公共服务网点

项目组成员信息

项目负责人	姓名	刘锋	性别	男	身份证号	440106196709052194
	学历	本科	职称	副研究馆员	现从事专业	图书馆学
	单位	华南农业大学			职务	图书馆馆长/中心主任
	手机	13719462268		E-mail	liufeng@scau.edu.cn	
	办公电话	020-85280745		签名		

项目组全部成员

	姓名	身份证号	单位	职务/职称	分工	签名
1	刘熙东	362133197412112315	华南农业大学	信息咨询部副部长/中心副主任/副研究馆员	统筹、检索、分析	
2	曹燕	510322197102210428	华南农业大学	副研究馆员	咨询、检索、分析	
3	程燕锋	440684198101173866	华南农业大学	副研究馆员	咨询、检索、分析	
4	何效平	142224197407162869	华南农业大学	讲师	咨询、检索、分析	

5	黄春晓	460031197908270820	华南农业大学	馆员	咨询、检索、分析	
6	刘洋	150203198911140629	华南农业大学	馆员	咨询、检索、分析	
7	陈铃诗	440103198707036043	华南农业大学	助理馆员	咨询、检索、分析	
8	张琴	420111197908137627	华南农业大学	信息咨询部副部长/副研究馆员	检索、分析	
9	李海华	440921198011070047	华南农业大学	馆员	咨询、检索、分析	
10	陈建红	410103198112135020	华南农业大学	副研究馆员	咨询、检索、分析	

项目工作情况

（总结基础性服务、低成本专业化服务和增值服务的工作情况及取得的成效等，2000 字左右）

华南农业大学知识产权信息服务中心，在党中央、国务院《知识产权强国建设纲要（2021—2035 年）》、国家知识产权局《知识产权公共服务“十四五”规划》的引领下，在广东省、广州市市场监督管理局（知识产权局）的领导下，以推动知识产权公共服务高质量发展为主线，丰富知识产权公共服务内容，便捷知识产权公共服务供给，夯实知识产权公共服务发展基础。

第一，中心立足现代农业特色，为涉农知识产权的创造、运用、保护和管理提供全面的信息服务，支撑科研创新和优势学科建设，提升学校的创新能力，促进科技成果转化。一方面，2022 年以来，累计完成专利分析导航报告 25 份。其中《华南农业大学专利信息分析年报（2022 年度）》、《华南农业大学 2022 年专利信息季报》等为学校知识产权管理体系建立完善、知识产权重大事务和重大决策、知识产权资产管理和运营服务提供参考咨询；《印楝素产业专利分析报告》、《融合多模态数据的生猪工厂化养殖环境精准调控装备及系统》、《岭南特色水果智能采收技术专利分析评议报告》等专业领域的分析报告为学校重点学科、领域开展服务，有力地促进了学科建设与创新发展。另一方面，坚持为学校科技成果管理部门提供有效发明专利价值评估分析报告，为学校高质量专利的培育、管理和转化提供参考，咨询报告包括《华南农业大学存量专利分级分类及价值评估分析报告》、《华南农业大学专利分析报告（申请版）》、《华南农业大学专利分析报告（公开版）》等。此外，为促进科技成果转移转化提供信息支持。完成

申报单位申明	
申报单位申明	本单位申报 2024 年度广州市知识产权项目，现郑重承诺： 本单位未被列入严重失信主体名单，且无 2020-2022 年承担市知识产权专项资金前补助项目验收未通过记录。 本单位具有健全的核算和会计制度，具有良好的社会信誉，依法经营，规范管理，经营和财务状况良好，没有进入破产清算程序，具有完成知识产权项目的工作基础和实施条件。 本单位保证所提供的申报材料真实有效，并承担因虚报材料可能引起的法律责任。 法定代表人（签名）：薛红巳 单位盖章： 2024年10月20日

四、其他业绩

4.1 指导学生学科竞赛

4.1.1 第四届“羊城 IP 杯”优秀指导教师 (C 类)



4.1.2 第三届“羊城 IP 杯”优秀指导教师 (C 类)



4.1.3 2022"智慧芽杯"高校专利检索大赛--全国总决赛优秀指导老师



4.2 个人荣誉

4.2.1 2025 年年度考核优秀

华南农业大学图书馆

2025 年年度考核等次认定公示

经馆各考核单位群众测评、业绩评定和馆考核工作小组测评，馆考核工作小组拟认定的在编教职工 2025 年年度考核等次情况予以公示如下(按部门排序)。

一、优秀等次人员 9 人

李肖（资源建设部）、曾虎（系统部）、宛凯林（流通阅览部）、彭跃峰（流通阅览部）、何建新（特色资源部）、张雪（信息咨询部）、田成（信息咨询部）、刘洋（信息咨询部）、陈建红（信息咨询部）

二、合格等次人员 48 人

王中海、姚红兵、伍　玲、黎小妮、周立军、黄承红、史艳丽、时卫锋、杨德惠、杨玲梅、王　红、张利梅、梅伟丽、李铁梅、严一梅、黄艳华、余杏芬、严四明、柳玲珠、郑丽君、侯菊玲、吴贤奇、刘　炼、刘熙东、何效平、陈铃诗、程燕锋、黄春晓、张　琴、曹　燕、袁玉花、李海华、卢炳卫、刘汉忠、欧　群、尹银怀、邓智心、张　进、吴　新、温明章、吴茵茵、欧阳中一、林锦霞、黄　征、康健明、邱冠文、郭春玲、关　磊

其中，合格等次人员中，王中海、关磊 2 人被评为馆优秀等次。

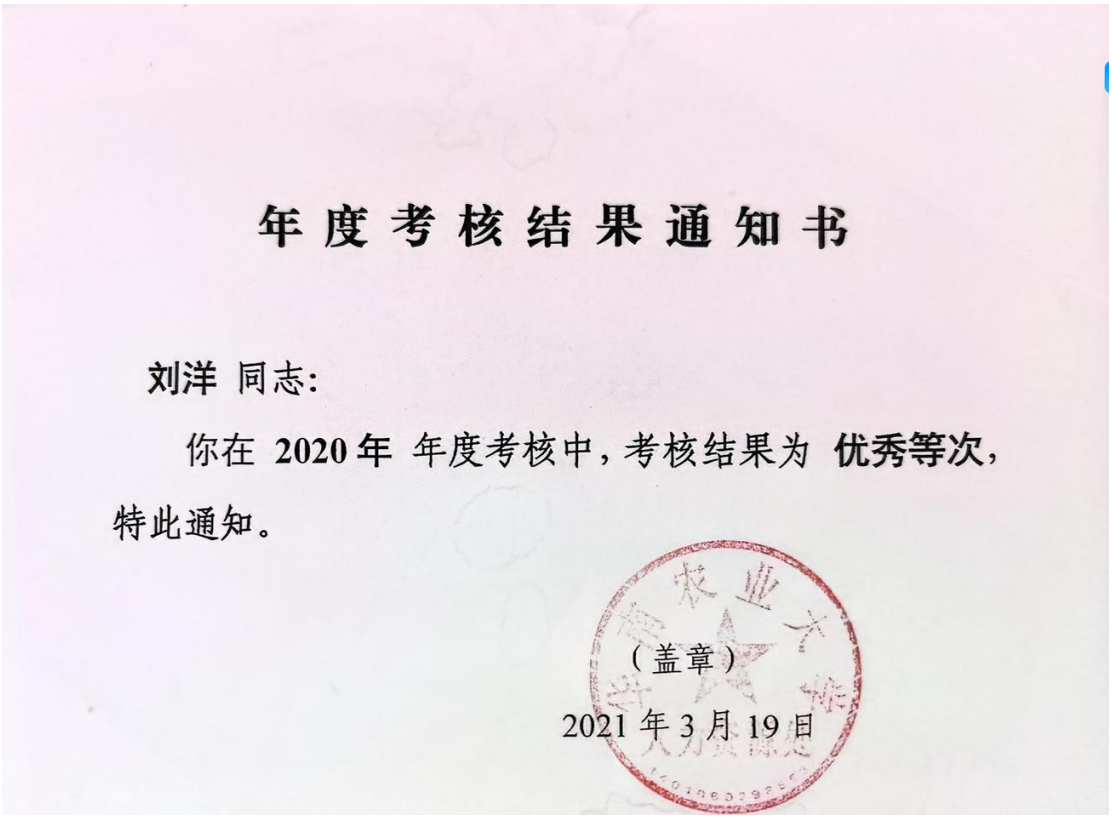
公示时间：2026 年 1 月 16 日（星期五）至 2026 年 1 月 20 日（星期二）三个工作日。

如对公示有异议，请于 2026 年 1 月 20 日（星期二）下午下班前向馆办反映，电话：85280144。

华南农业大学图书馆

二〇二六年一月十六日

4.2.2 2020 年年度考核优秀



年度考核结果通知书

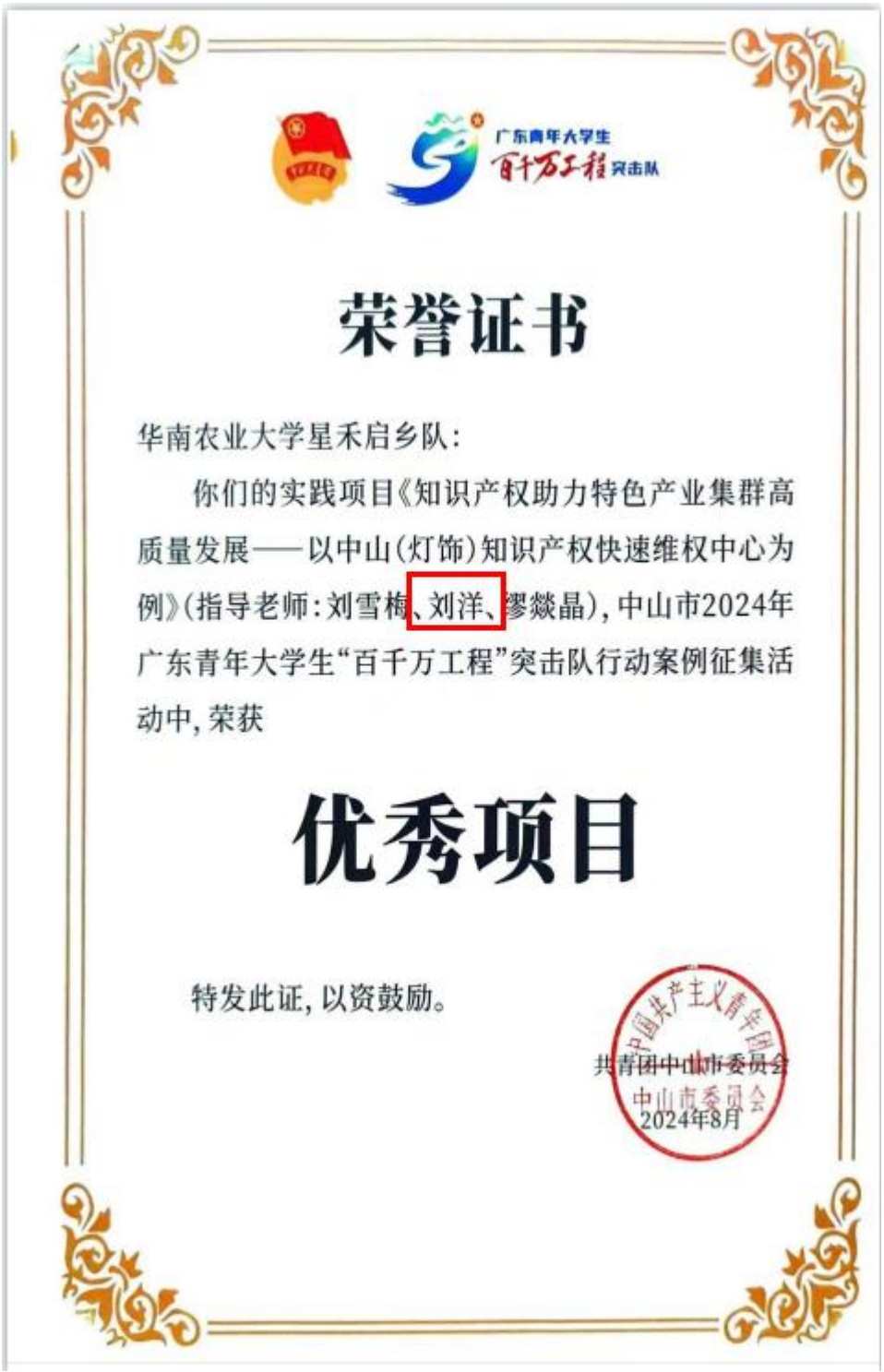
刘洋 同志:

你在 2020 年 年度考核中，考核结果为 优秀等次，特此通知。

（盖章）

2021 年 3 月 19 日

4.2.3 “百千万工程”优秀指导教师



广东青年大学生 百千万工程突击队

荣誉证书

华南农业大学星禾启乡队：

你们的实践项目《知识产权助力特色产业集群高质量发展——以中山(灯饰)知识产权快速维权中心为例》(指导老师：刘雪梅、刘洋、缪燚晶)，中山市2024年广东青年大学生“百千万工程”突击队行动案例征集活动中，荣获

优秀项目

特发此证，以资鼓励。

中国共产主义青年团 共青团中山市委员会 中山市委员会 2024年8月

五、其他获奖和业绩材料

5.1 2019 年图书馆年度考核馆内优秀

华南农业大学图书馆

2019 年年度考核被考核人的考核等次认定公示

经馆各考核单位群众测评和馆考核工作小组测评，馆考核工作小组拟认定的在编教职工 2019 年年度考核等次情况予以公示如下（按部门排序）。

一、优秀等次人员 12 人

黎小妮（资源建设部）、徐美兰（资源建设部）、侯菊玲（特色资源部）、黄艳华（流通阅览部）、柳玲珠（流通阅览部）、李铁梅（流通阅览部）、刘熙东（信息咨询部）、欧　群（信息咨询部）、张　琴（信息咨询部）、温明章（系统部）、黄　征（阅读推广部）、高咏彤（办公室）

二、合格等次人员 71 人

王中海、伍　玲、谭　静、周立军、黄承红、李　肖、史艳丽、周　露、屈　玮、梅伟丽、时卫锋、何建新、黄　智、杨玲梅、郑丽君、王　红、张利梅、邝少敏、宛凯林、崔惠敏、宗栓金、严一梅、夏　杰、罗翠容、刘玉江、刘玉兰、余杏芬、宋　君、于卉兰、严四明、彭跃峰、雷德蓉、陈　菁、杨继碧、罗宏珍、乔世昆、涂建云、丁　敏、吴贤奇、郑晓梅、刘汉忠、曹　燕、尹银怀、程燕锋、陈建红、邓智心、卢炳卫、袁玉花、张　进、何效平、张　雪、潘　科、黄春晓、李海华、刘　炼、田　成、刘　洋、陈铃诗、吴茵茵、欧阳中一、曾　虎、林锦霞、韩明明、王小菊、季　频、康健明、曹　珂、邱冠文、彭细珍、杨德惠、关　磊

其中，合格等次人员中，涂建云、卢炳卫、夏　杰、刘　洋等 4 人被评为

馆优秀等次。

公示时间：2020 年 5 月 22 日（星期五）至 2022 年 5 月 26 日（星期二）的三个工作日。

如对公示有异议，请于 2020 年 5 月 26 日（星期二）下午下班前向馆办反映，电话：85280144；邮箱：1073671712@qq.com。

图书馆

二〇二 0 年五月二十二日

5.2 教育部优秀征文二等奖



荣誉证书

刘洋：

您的论文《高价值专利指标探讨——基于中国金奖专利的实证分析》在2020年高校知识产权学术交流会“提升高校专利质量，促进转化运用”征文活动中，荣获：

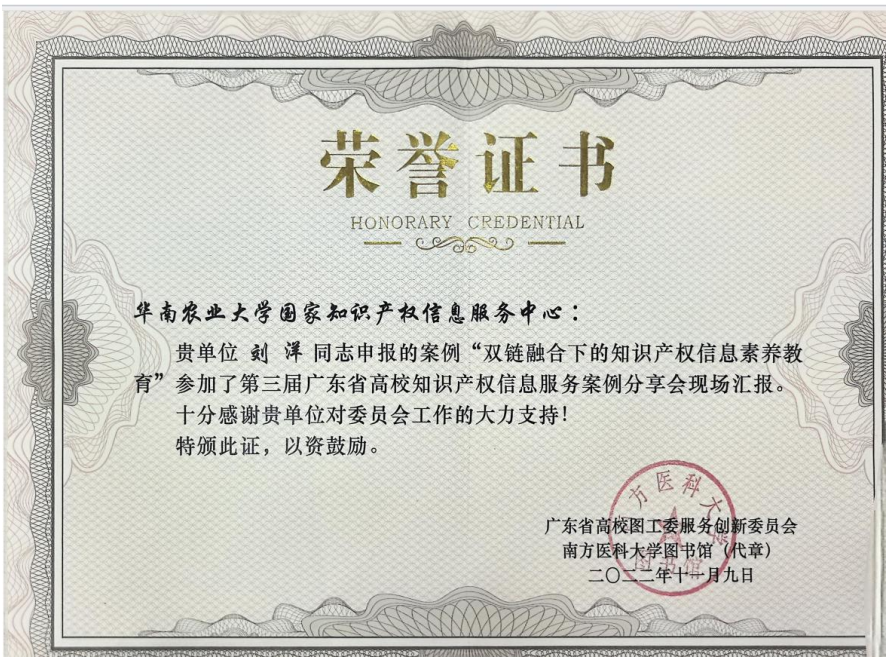
二等奖

特发此证，以资鼓励。

《中国高校科技》杂志社

二〇二〇年十二月十四日

5.3 广东省知识产权信息服务优秀案例



荣誉证书

HONORARY CREDENTIAL

华南农业大学国家知识产权信息服务中心：

贵单位 刘 洋 同志申报的案例“双链融合下的知识产权信息素养教育”参加了第三届广东省高校知识产权信息服务案例分享会现场汇报。

十分感谢贵单位对委员会工作的大力支持！

特颁此证，以资鼓励。

广东省高校图工委服务创新委员会

南方医科大学图书馆（代章）

二〇二二年十一月九日

5.4 参与省内知识产权公共服务网点建设情况评估并获“优秀”



网站链接：关于省内知识产权公共服务网点建设情况评估结果为“优秀”单位的公示-广东省市场监督管理局网站（gd.gov.cn）

广东省市场监督管理局

粤市监办发〔2024〕869号

广东省市场监督管理局办公室关于省内知识产权公共服务网点建设情况评估结果的通报

各地级以上市市场监督管理局：

根据《广东省市场监督管理局办公室关于开展2024年度省内知识产权公共服务网点建设情况评估工作的通知》（粤市监办发〔2024〕293号）要求，为全面评估省内知识产权公共服务网点工作情况，提升服务效能，省市场监管局组织对各地级以上市市场监管部门指导建设的国家级知识产权公共服务网点2023年工作情况进行了评估，现将评估结果通报如下。

一、评估总体情况

此次评估对象为各地级以上市市场监管部门指导建设的22家国家级知识产权公共服务网点。经过网点自评、地市初审、实地调研、专家评审、综合评价、结果公示等程序，佛山市知识产权保护中心、中国（深圳）知识产权保护中心、广东省科技图书

馆（广东省科学院信息研究所）、横琴国际知识产权交易中心有限公司、深圳大学、东莞理工学院、华南农业大学、广州中新知识产权服务有限公司、华南师范大学、广州奥凯信息咨询有限公司、河源市农业知识产权运营服务中心等11家网点评估结果为优秀。

二、评估发现的亮点

（一）知识产权数据平台助力创新成果更加普惠可及。各网点积极引入和用好“粤港澳知识产权大数据综合服务平台”和“欧盟商标信息查询系统”等知识产权数据平台，为省内创新主体提供丰富的知识产权数据资源，有效推动创新成果更好惠及创新主体。汕头大学技术与创新支持中心（TISC）建设“创新合子”网络服务平台，开展开放式知识产权信息服务，有效提升学校创新实力和效力；广州奥凯信息咨询有限公司技术与创新支持中心（TISC）开发“壹专利”专利数据检索平台等知识产权数据产品，建设一批专利数据库，为创新主体提供信息资源、基础检索、咨询和宣传等知识产权服务，有效提升了中小微企业知识产权信息获得便利度和准确性。

（二）知识产权信息利用有效提升创新起点和降低创新成本。各网点着眼全省战略科技力量、新领域新业态、区域重点产业等领域，有效运用知识产权信息提高创新起点和水平，节约创新时间和经费，实现“站在巨人的肩膀上”进行“节约而高效”的创新式研发。广东科技图书馆技术与创新支持中心（TISC）牵头组建相关领域“专精特新”企业创新联合体，年内为企业提供7000多项查新、收引等信息服务，助力提升产业链韧性与安全性；横

5.5 2023 年度知识产权信息公共服务优秀案例



【打印】【字体：大 中 小】 分享到：

广州市市场监督管理局关于公布2023年度知识产权信息公共服务优秀案例的通知

发布日期：2024-07-04 浏览次数：3810

各区市场监管局、广州开发区知识产权局，广州知识产权保护中心，各网点机构：

为推动知识产权公共服务整体效能普惠升级，提升知识产权信息传播和利用效能，总结推广知识产权信息公共服务先进做法和典型经验，充分发挥优秀案例示范引领作用，强化公共服务机构间的交流分享，更好服务创新创业主体，让创新成果更好惠及人民。广州市市场监督管理局现公布一批知识产权信息公共服务优秀案例，各区市场监管局和各网点机构要积极学习借鉴优秀案例经验做法，进一步拓展服务渠道、丰富服务内容、全面提升知识产权公共服务的效能，以优质的知识产权公共服务激发高质量发展的新活力，助力广州新质生产力的发展。

特此通知。

附件：1.2023年度广州市知识产权信息公共服务优秀案例清单.docx

2.2023年度广州市知识产权信息公共服务网点优秀案例.docx

广州市市场监督管理局

2024年7月4日

附件 1

2023 年度广州市知识产权信息公共服务优秀案例清单

序号	报送单位	案例名称
1	广东省科技图书馆（广东省科学院信息研究所）	专利导航促进半导体企业创新突破，加速培育新质生产力
2	华南师范大学	心中有“数”，全“数”前进，——以“数据”为核心开展知识产权信息服务
3	华南农业大学	双向延伸 三方携手 助力农业高质量发展
4	广州华南新材料创新园有限公司	商标服务报告+商标导航报告，双管齐下助力企业商标培育布局
5	广东省华南技术转移中心有限公司	粤港澳大湾区知识产权运营服务集聚项目
6	广州中新知识产权服务有限公司	培育挖掘、核准使用、品牌建设、运用促进，“四位一体”赋能地理标志助力乡村振兴
7	广州奥凯信息咨询有限公司	以建设知识产权运营转化对接平台，支持高科院所的技术成果向中小微企业转化
8	广州实验室	科研项目全过程知识产权管理服务

5.6 获教育部科技查新员资格


高校科技查新员培训班
结业证书

姓 名：刘洋

学 校：华南农业大学

编 号：2020JYCX124

2020年11月参加高校科技查新员培训班学习，成绩合格，特发此证。

教育部科技发展中心

二〇二〇年十一月

5.7 获知识产权管理体系内审员资格



SIST

知识产权管理体系内审员培训合格证书

证书编号：SIST-IPMS-GX-2019-0024

刘洋

150203198911140629

于 2019 年 05 月 08 日-2019 年 05 月 09 日在广东省深圳市参加并完成了高等学校知识产权管理体系内审员培训全部课程，参加培训结业考试，成绩合格，特发此证。

深圳市标准技术研究院

发证日期：2019年05月22日

5.8 高校知识产权信息服务中心联盟培训



编号：AUIPIS03042/2020

结业证书

The AUIPIS
高校知识产权信息服务中心联盟

刘 洋 于2020年11月参加高校知识产权信息服务中心联盟2020年年会暨第三届培训研讨会，完成全部课程，经考核成绩合格，特发此证。

高校知识产权信息服务中心联盟
同济大学知识产权信息服务中心（代章）
二零二零年十一月

5.9 通过教育部高等学校图书情报工作指导委员会信息素质培训



NENULIB

INFORMATION LITERACY
PEDAGOGY TRAINING
PROGRAMM

教育部高校图工委信息素质
培训研讨会
2019

证 书

CERTIFICATE

刘洋

参加教育部图工委信息素质培训研讨会（2019年6月18日—23日），修完规定40课时学习内容，特此证明。

教育部高等学校图书情报工作指导委员会
东北师范大学图书馆（代章）
2019年6月23日