Digital Servitization in UK SMEs

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Shortcomings of (Digital) Servitization DS research

- Digital servitization: The convergence between servitization and digital technologies
- Issues warranting further research:
  - Lack of quantitative measures of DS
  - Over-representation of qualitative studies
  - Limited and/or unclear applicability of insights to SMEs
  - Limited understanding of the factors that lead firms to *choose* one (digital) servitization business model over another
  - Limited understanding of what constellations/configurations of conditions improve performance of firms *choosing different business models*

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Aim

- To identify contextual and organisational factors that differentiate between Business Models:
- Contextual Determinants:
  - Competitive Intensity
  - Demand Unpredictability
  - Product/Process Complexity
  - ~~Technological Turbulence~~ ☹
- Organisational Determinants:
  - Product-Service Distinctiveness
  - Service orientation of employee culture
  - Digitalisation maturity
  - Entrepreneurial Orientation

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DS typology applicable to SMEs

- The project developed and operationalised a typology.
- Main influences
- Suppatvech et al. (2019) and Kohtamäki et al. (2019)
    - 0: Pure product (no services)
    - 1: Product + Services (digital technologies play no role in providing them)
    - 2: Add-on
    - 3: Usage-based
    - 4: Solution-oriented
    - 5: Platform (Cenamor et al. 2019)

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DS typology applicable to SMEs

○ 3. The **'add on'** business model: Our company employs digital technologies **to enable additional functions or add customized services** to our existing physical product or service. Here, technology embedded in the product (such as sensors, actuators, software, connectivity components) enables **the provision of digital features such as software applications, and/or service**s (e.g., continuous or on-demand access to information, feedback and/or reports), that help the customer make their use of the product, or their process/operation, more efficient

○ 4. The **'usage-based'** business model: Our company employs digital technologies to enable customers **to use our product, while the ownership of the product remains with our company (or a third party).** Customers pay based either on a negotiated plan, or on the actual usage of the product. Technology embedded in the product measures and **monitors its usage/consumption to enable 'pay-per-use', or to make a service/product available for a restricted, contractually agreed, time span.** The product(s) can either be cycled among customers, (i.e., a 'leasing' model where digital technology is used to monitor and grant access, schedule product maintenance, etc.) or remain exclusive to a single customer for the duration of a contract.

○ 5. The **'solution-oriented'** business model: Our company employs digital technologies to **provide a contractually agreed outcome,** such as a certain level of continuous utilization and uninterrupted usage (i.e., availability), or performance of the product, to a specific customer. Here digital **technology allows our company to access real-time information on the product's status and/or pattern of its operation, in order to offer more effective maintenance, repair and operational support services (e.g., advice, consulting) to ensure the agreed outcome**, and in extension, to optimize a core process/operation of the customer.

○ 6. The **'platform'** business model: Our company provides and manages **a digital 'platform' that enables access to our company's product(s) and/or service(s), or facilitates the exchange** of products, services and information between providers and customers, aiming to create value for all parties, by, for example, optimizing asset utilization or making processes more efficient.

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Measure of “degree” of Digital Servitization

- Formative index comprising the number of, broadness of, and emphasis on, a portfolio of *digital* services (e.g., Homburg et al., 2002):
    1. Remote monitoring of product condition
    2. Remote diagnostics
    3. Remote control of product operation and usage optimization
    4. Remote maintenance, upgrade and/or repair of product
    5. Remote provision of access to information (e.g., automated analysis of operational information, predictive analytics), feedback and/or reports
    6. Predictive maintenance
    7. Cloud services (e.g., Software-as-a-service, Infrastructure-as-a-service, Platform-as-a-service)

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Data collection and analysis

- Pilot (38 respondents – Qualtrics)
- Main study: N=348 after removing inappropriate responses and outliers (Qualtrics)
- Established scales for all factors were used

[controls: customer nature, SME age & size, primary industry]

EFA -> removal of bad performing items -> factor scores (means)

Data analysis:

1. **Outcome = BM choice (Multinomial logistic regression)**
2. Outcome = “Degree” of DS (Linear Regression)

Descriptive Analysis

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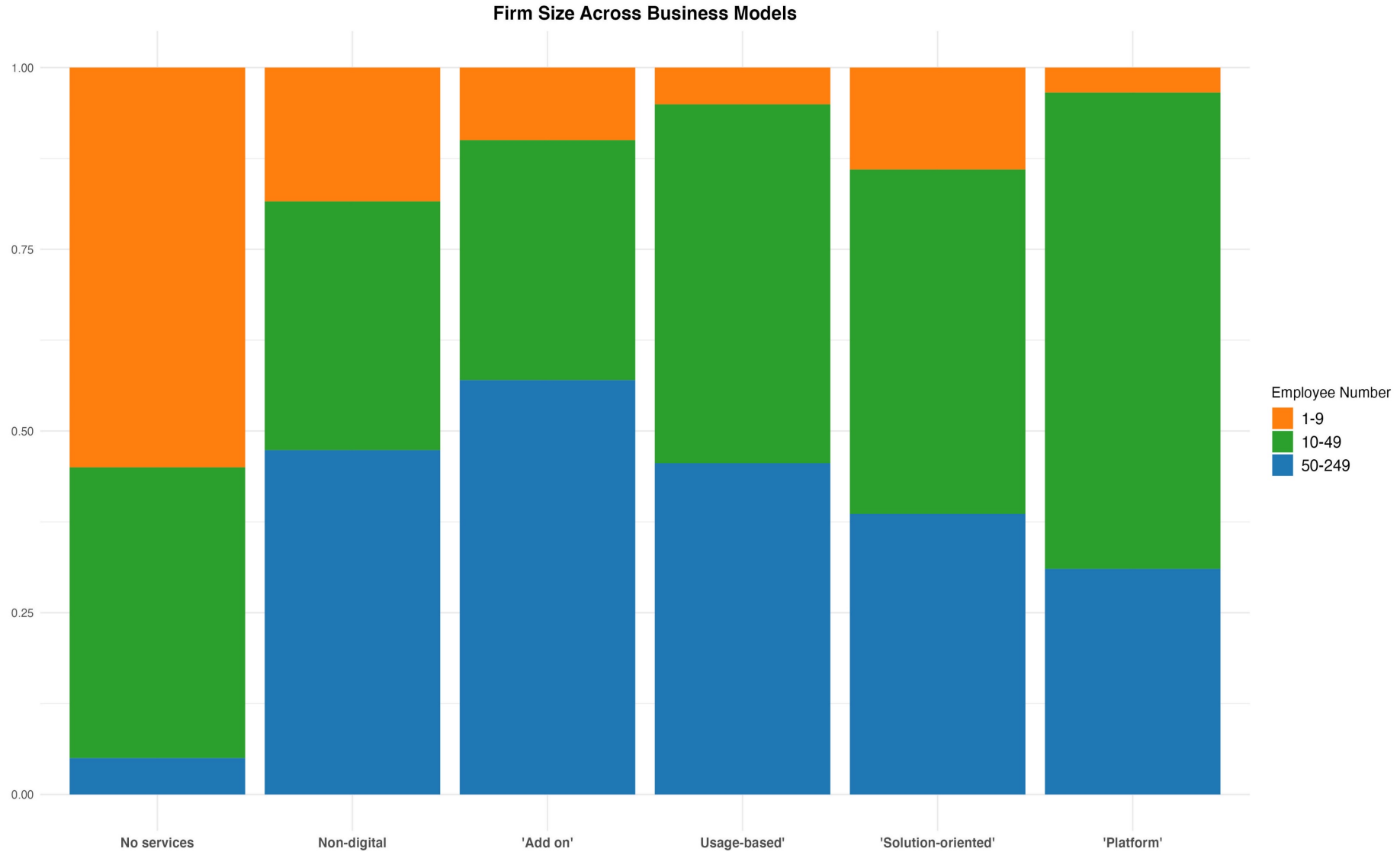
SME Size across Business Models



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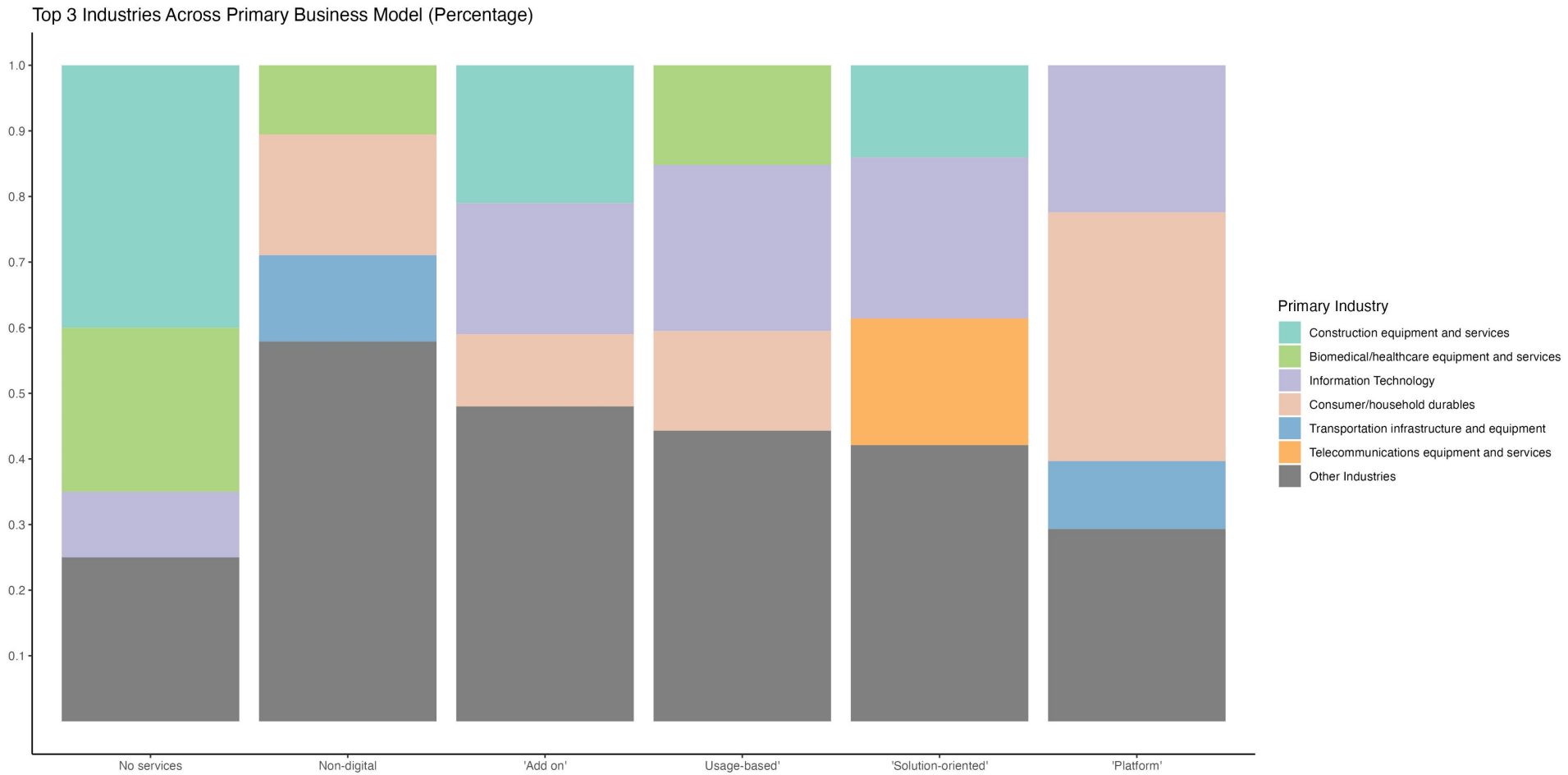
Industry distribution by Business Model



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Degree of Digital Servitization by Industry

Primary_Industry	Mean	SD	Median	Min	Max
Power generation	38.30612	30.63199	24.42857	11.7551020	82.77551
Consumer/household durables	49.69274	66.99594	19.83673	0.0000000	308.85714
Biomedical/healthcare equipment and services	83.92976	92.70168	55.18367	0.0000000	274.28571
Transportation infrastructure and equipment	83.25990	94.54995	41.95918	0.0000000	270.00000
Automobiles and automotive components	27.65079	24.03771	21.33673	0.0000000	79.59184
Information Technology	122.76644	112.61975	88.67347	0.0000000	343.00000
Engineering equipment and tools	39.79388	59.56729	15.30612	0.0000000	252.00000
Telecommunications equipment and services	139.54044	102.13713	133.34694	0.8571429	343.00000
Industrial machinery	57.98701	70.47278	13.77551	0.0000000	190.28571
Other electrical or mechanical equipment	65.12245	109.71945	19.51020	0.0000000	282.00000
Aerospace and defence	49.27551	42.66671	38.69388	0.3265306	106.53061
Shipbuilding & maritime equipment	110.85714	72.85921	104.51020	45.7142857	256.28571
Construction equipment and services	73.02636	99.34738	28.54082	0.0000000	343.00000

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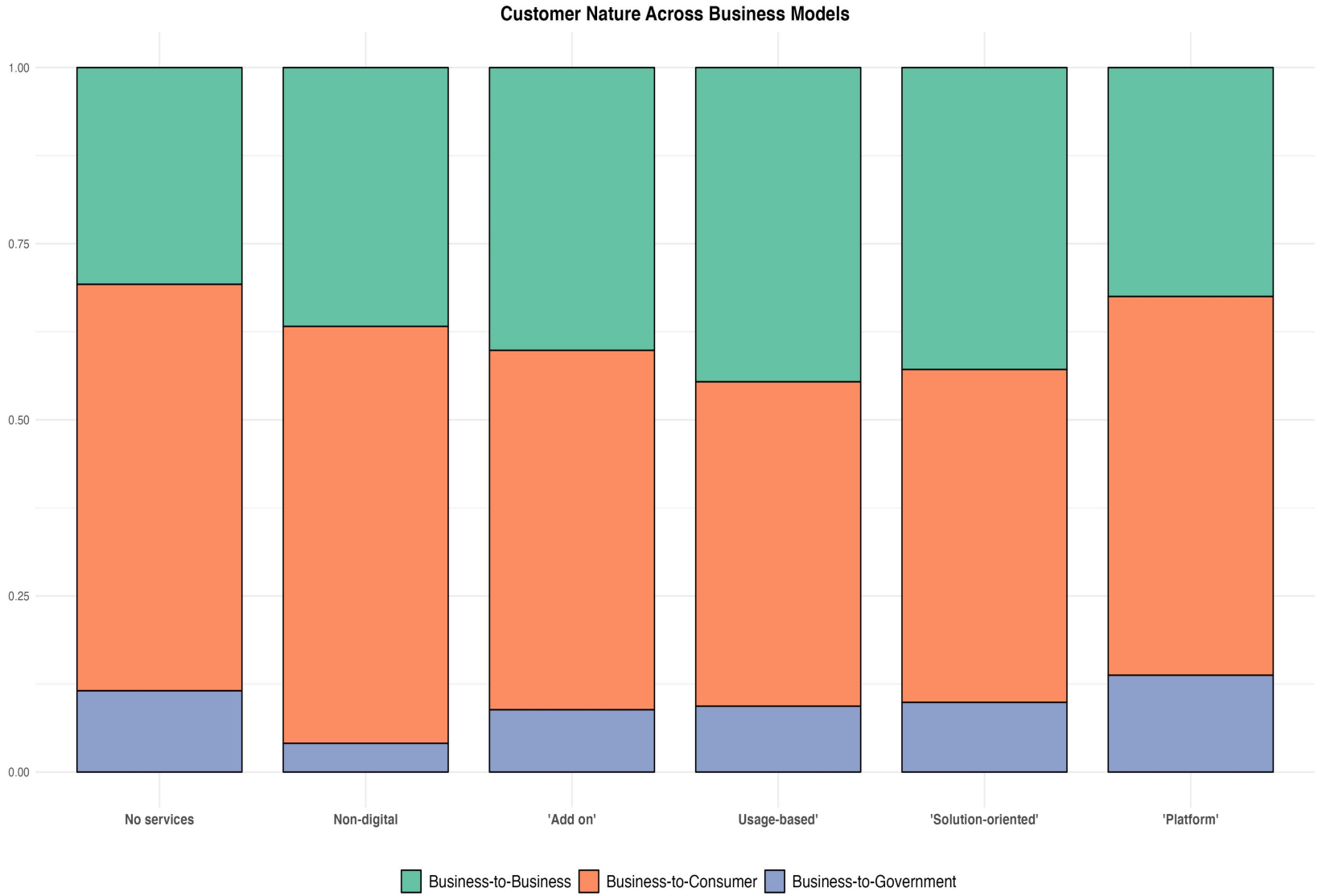
Customer Nature by Business Model



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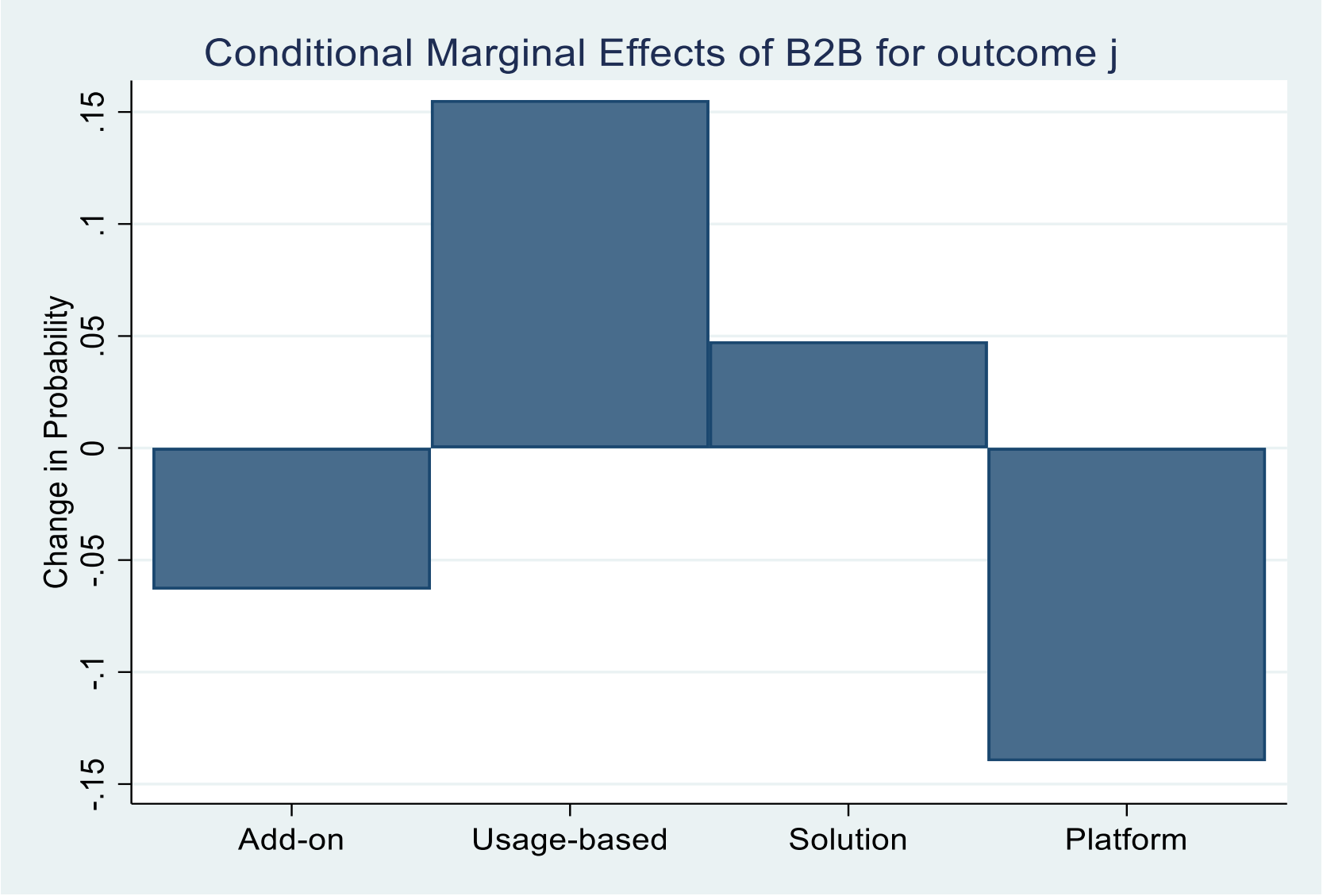
Customer Nature by Business Model (Marginal Effects)

Chi2(3)=13.42***



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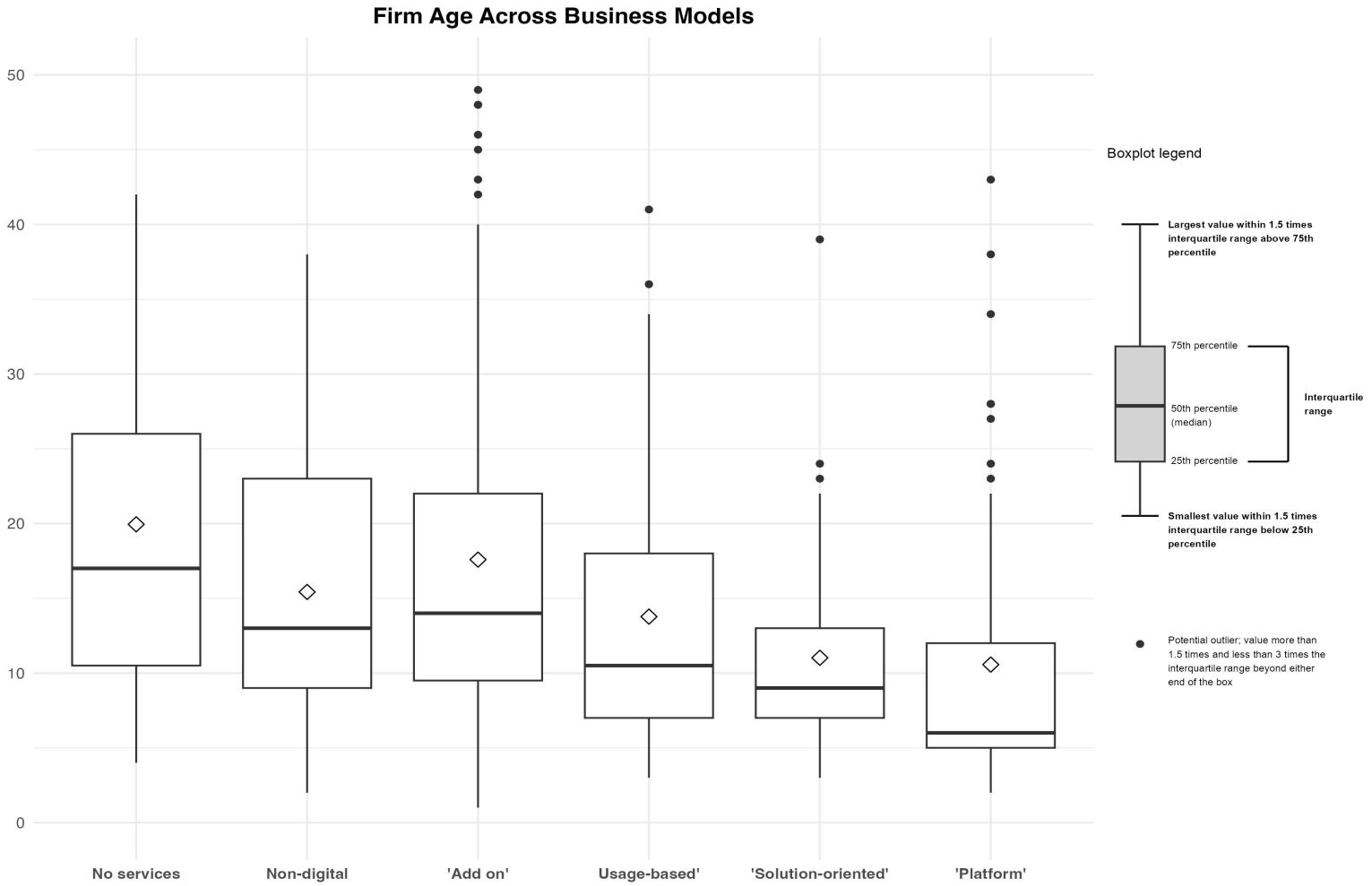
SME Age across Business Model



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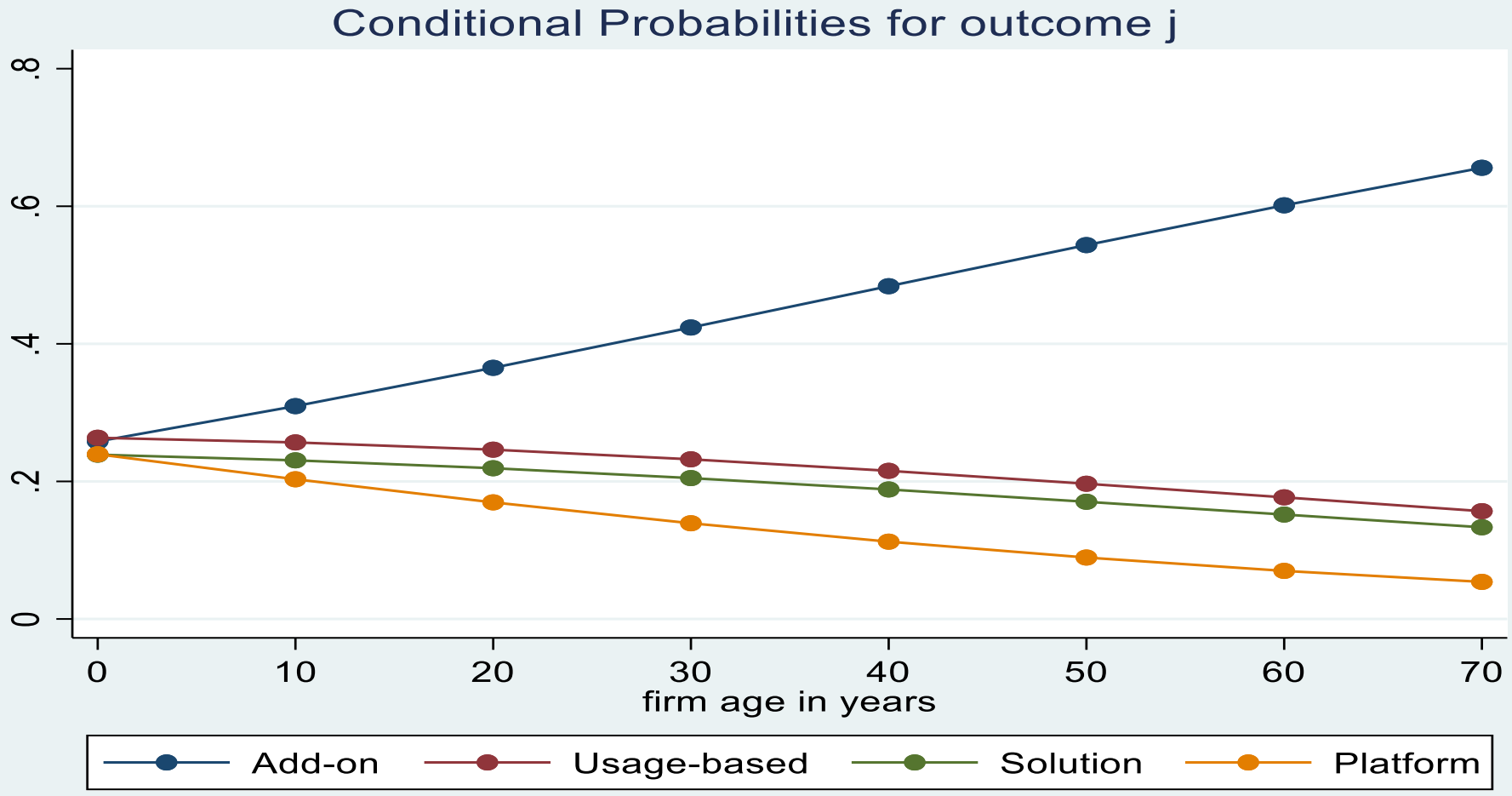
Comparing only Digital Servitization BMs, ‘add-on’ becomes increasingly more likely with age

Chi2(3)=8.71**



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Results (1)

Digital Servitization in UK SMEs

Not servitized & Servitized but not Digitally

Vs

All Digital Serv. Business Models

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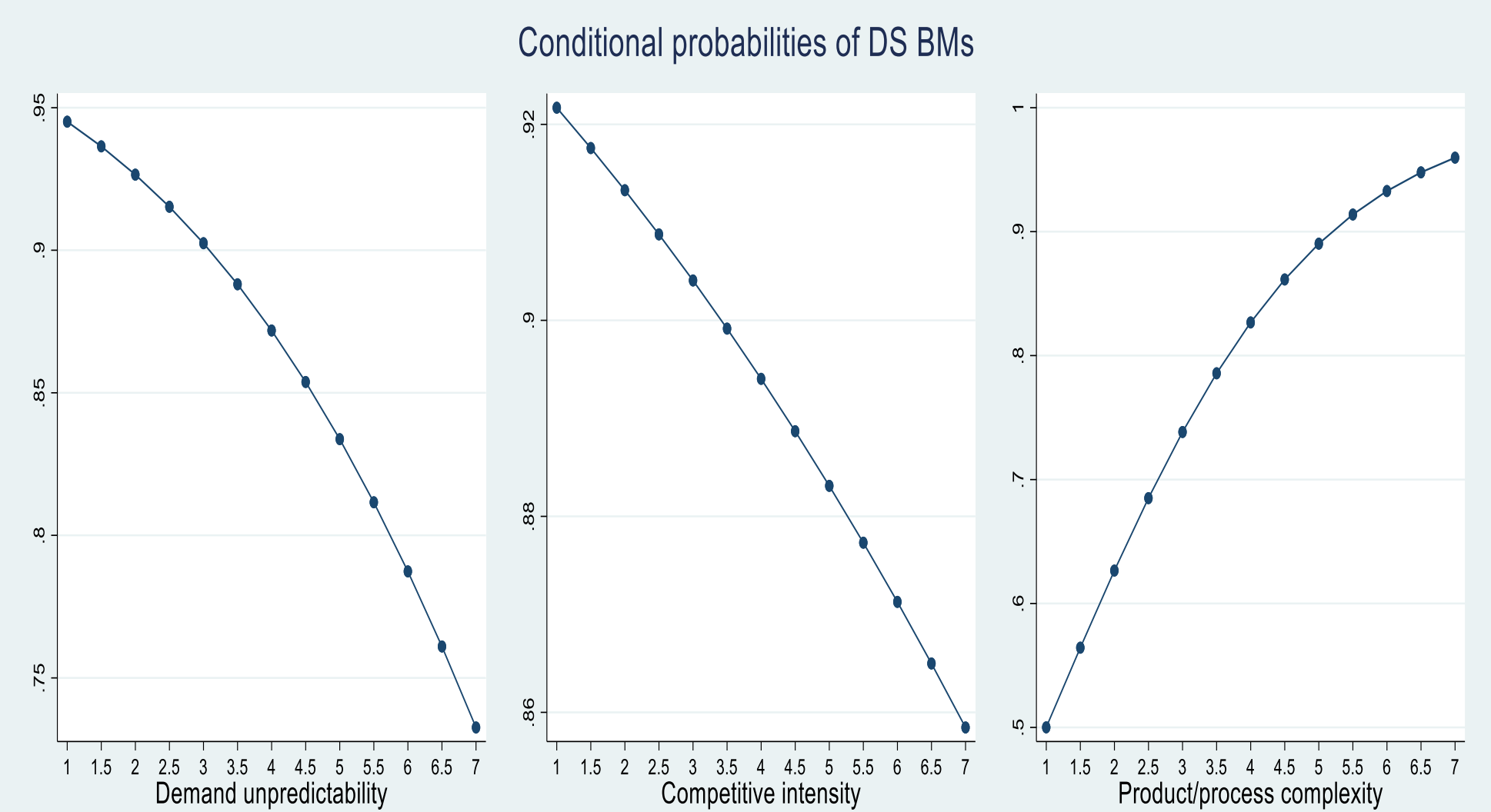
(Binary) Logistic Regression Results



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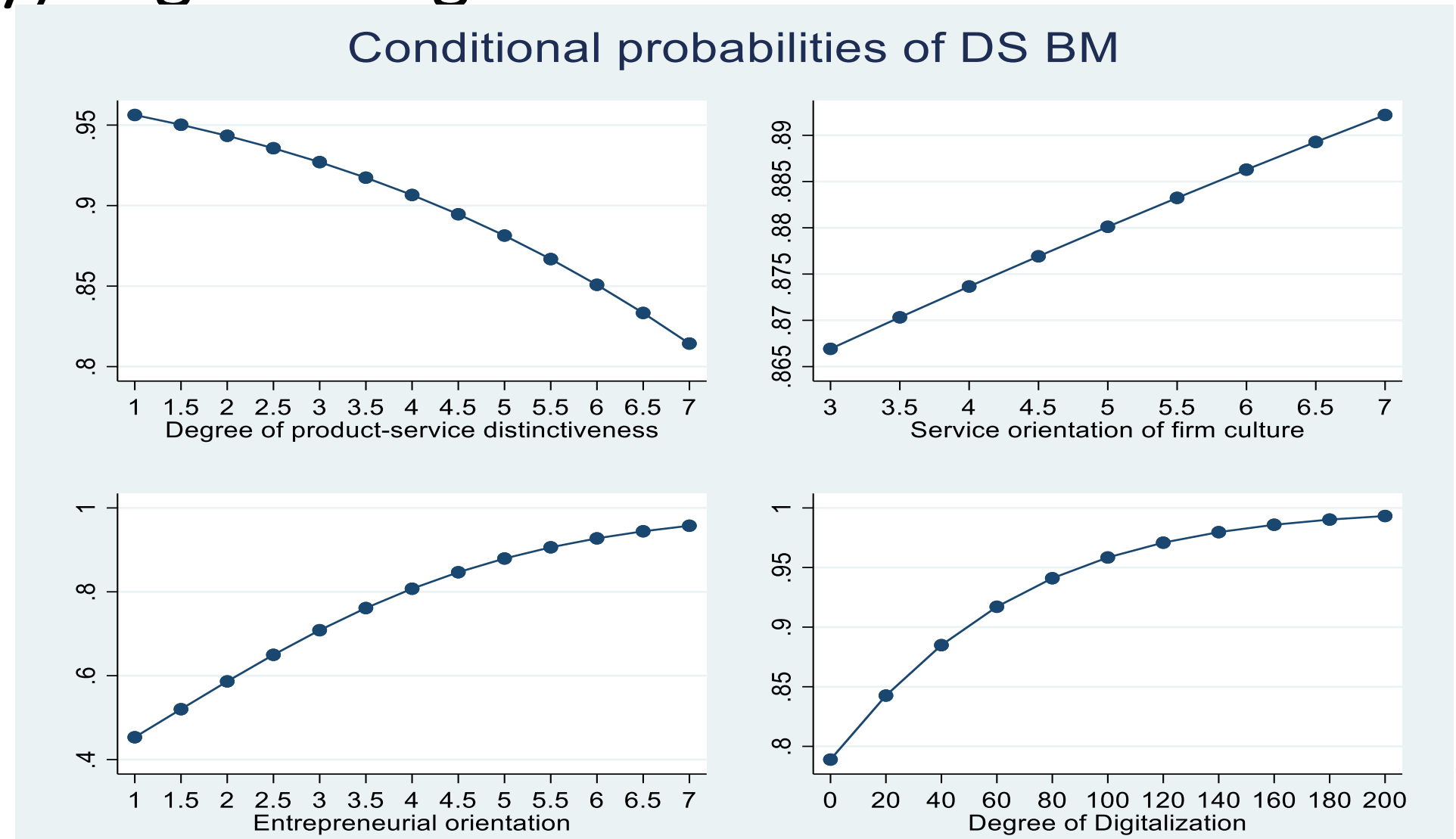
(Binary) Logistic Regression Results



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Results (2)

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Digital Serv. Business Model Choice
Add-on *vs* Usage-based *vs* Solution-oriented *vs* Platform

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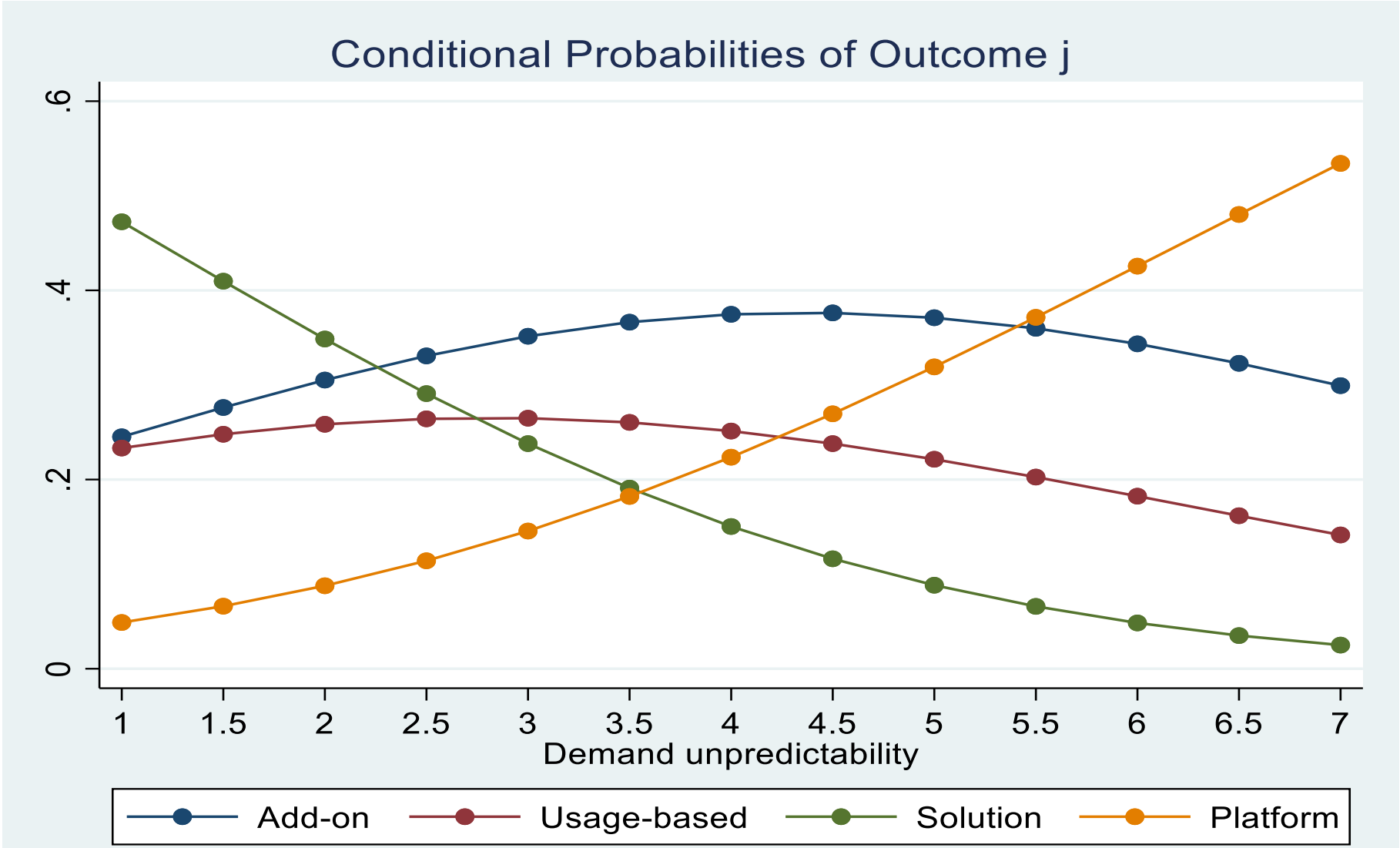
Demand Unpredictability



Chi2(3) = 23.02***

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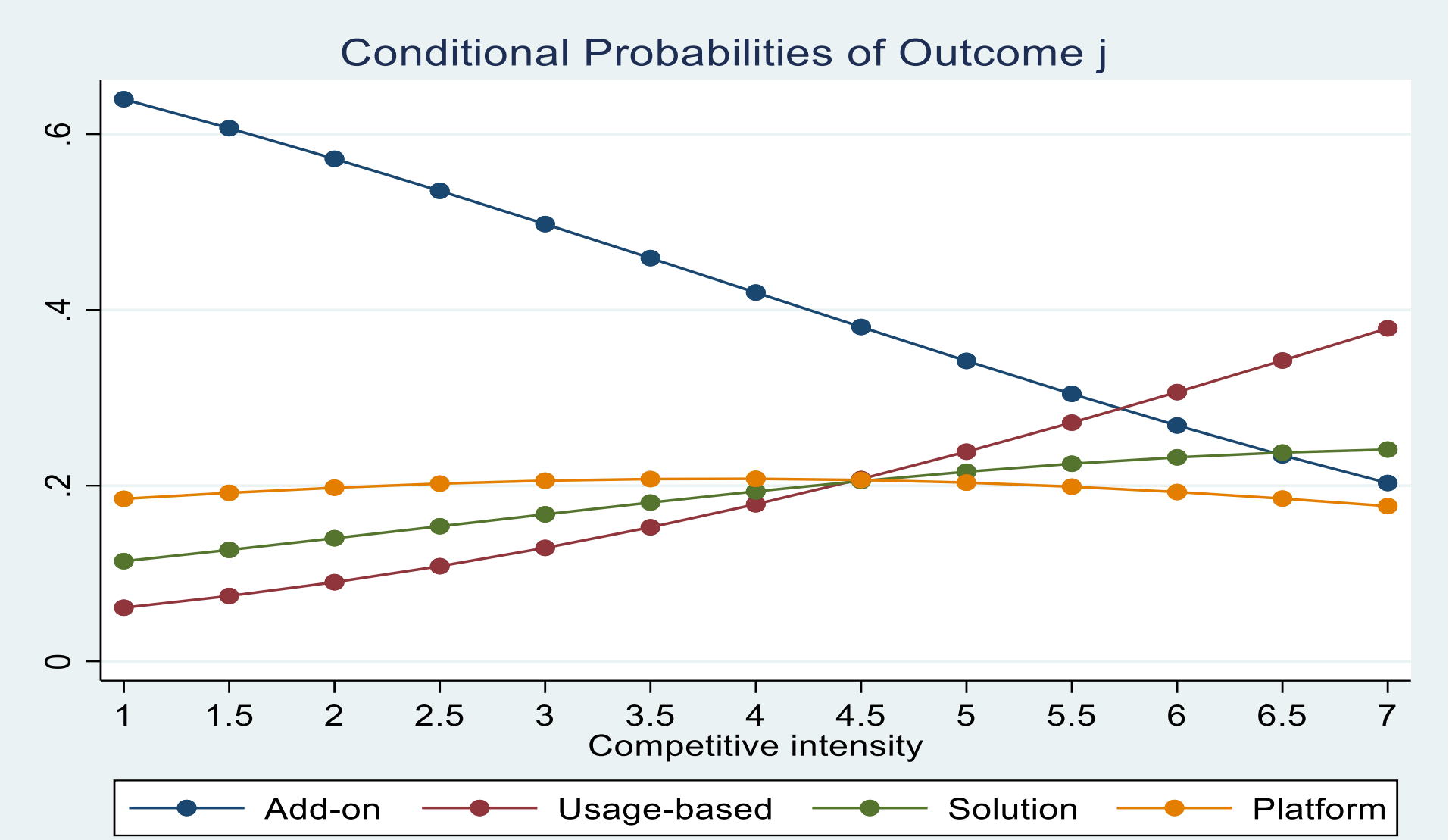
Competitive Intensity

Chi2(3)=8.17**



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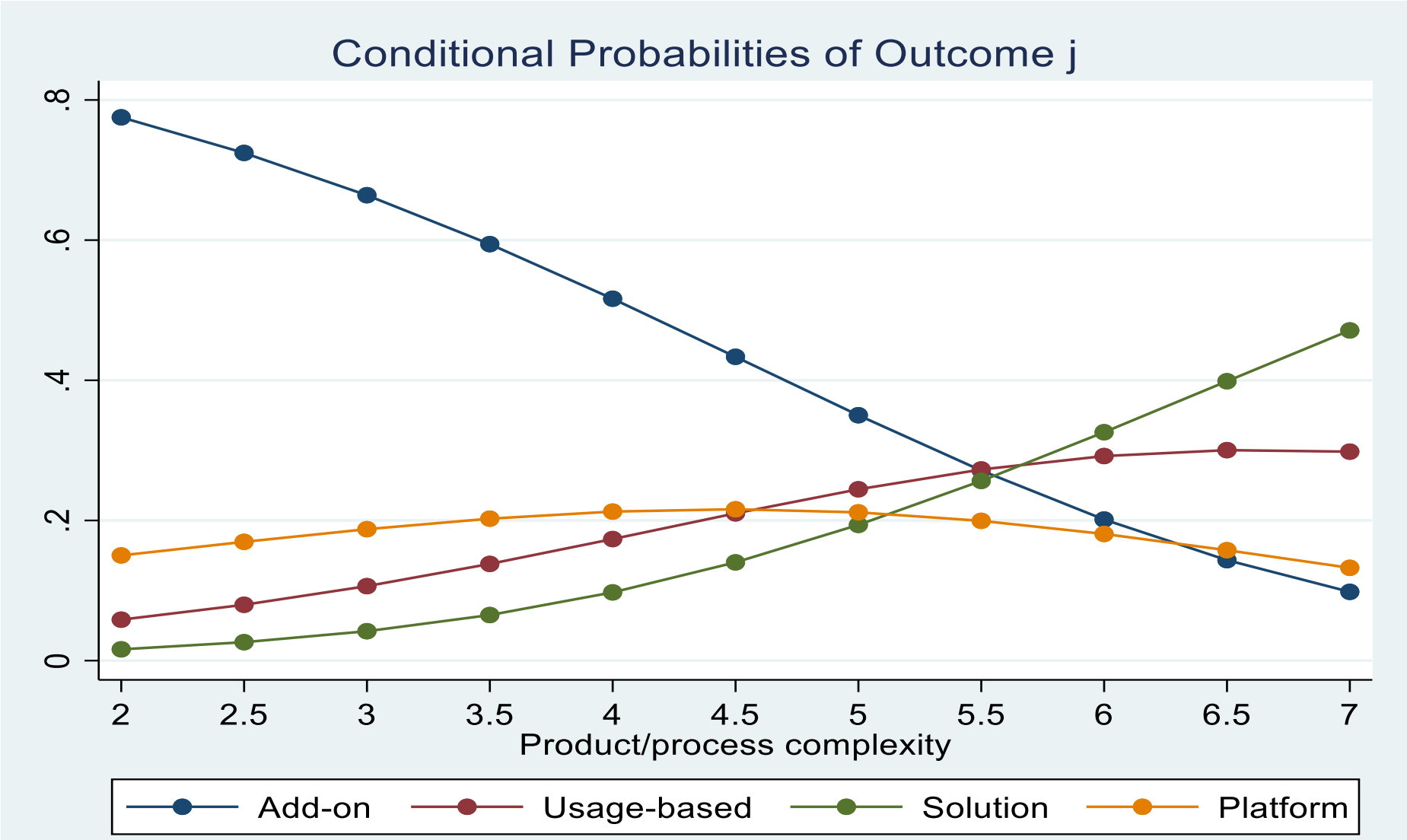
Product-process complexity

Chi2(3)=21.13***



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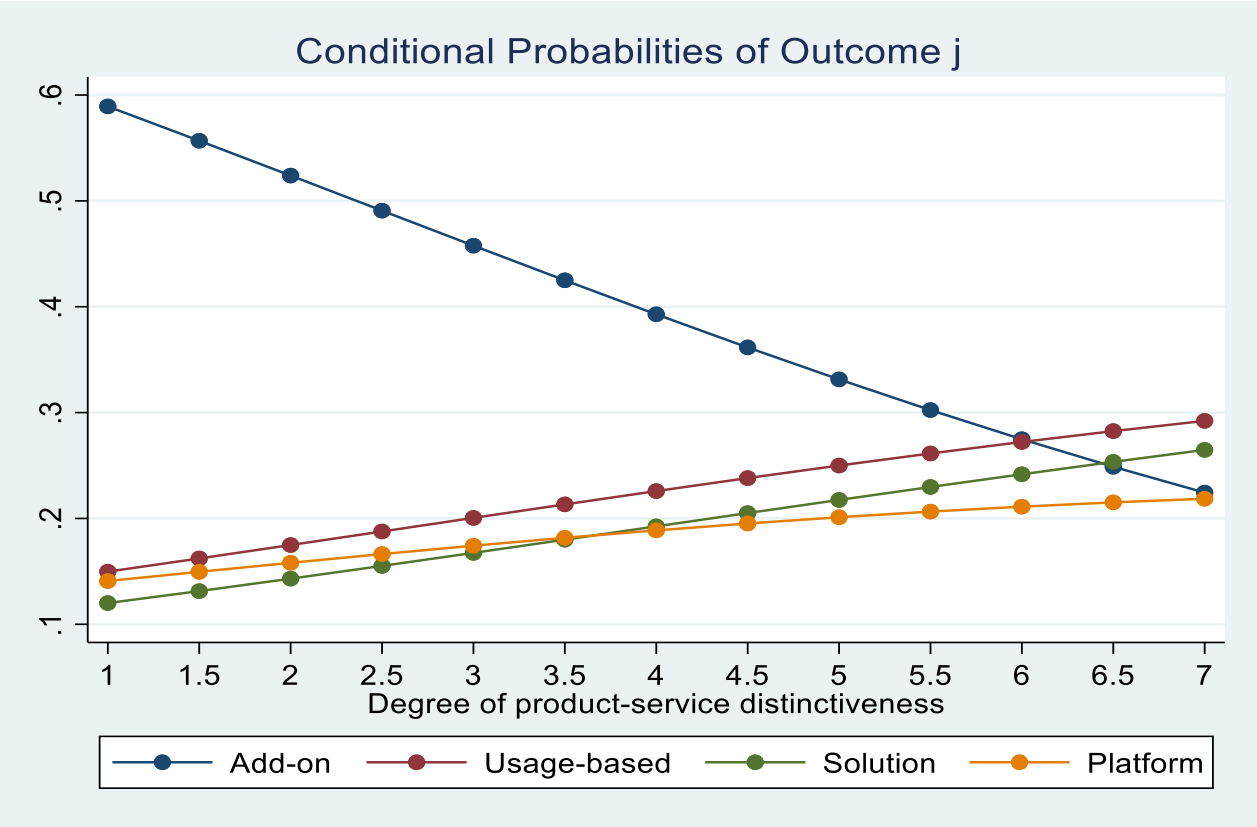
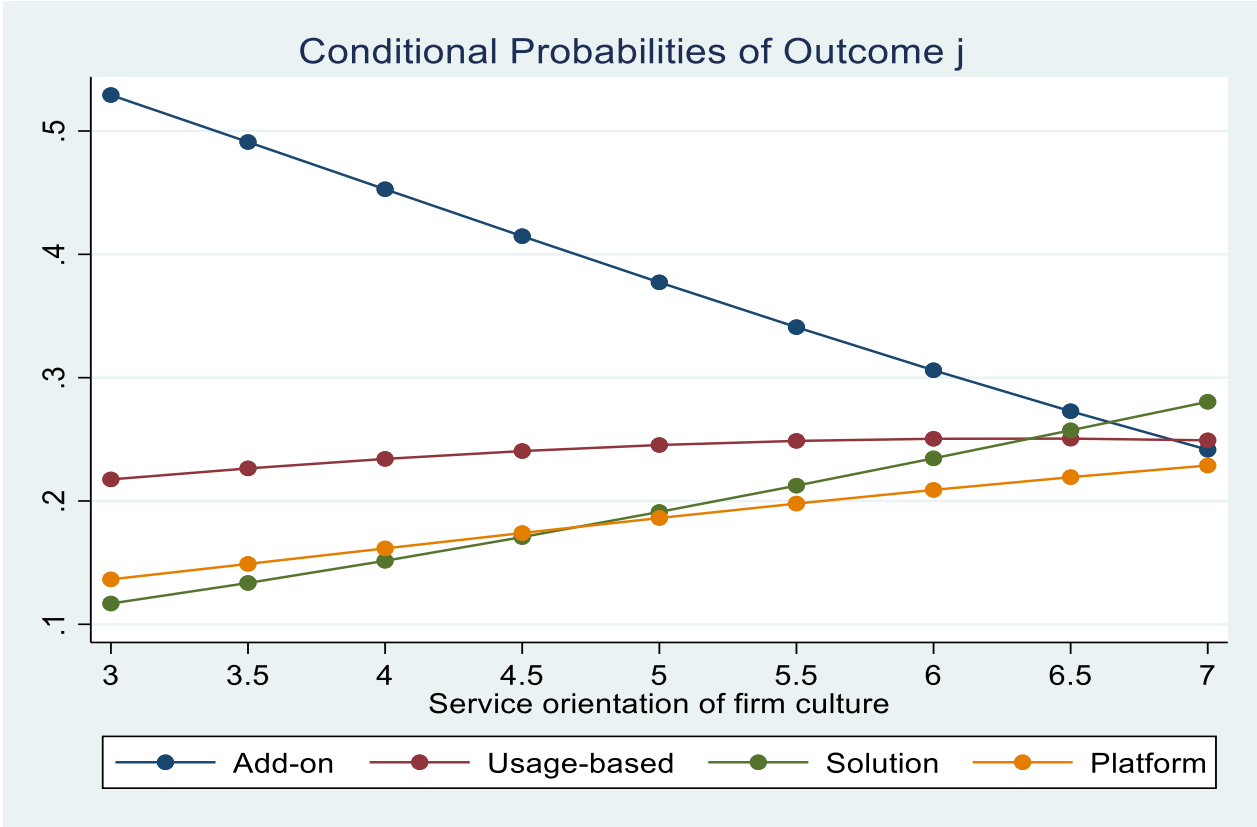
Organisational distinctiveness & service orientation of employee culture





Chi2(3)=5.78

Chi2(3)=4.55

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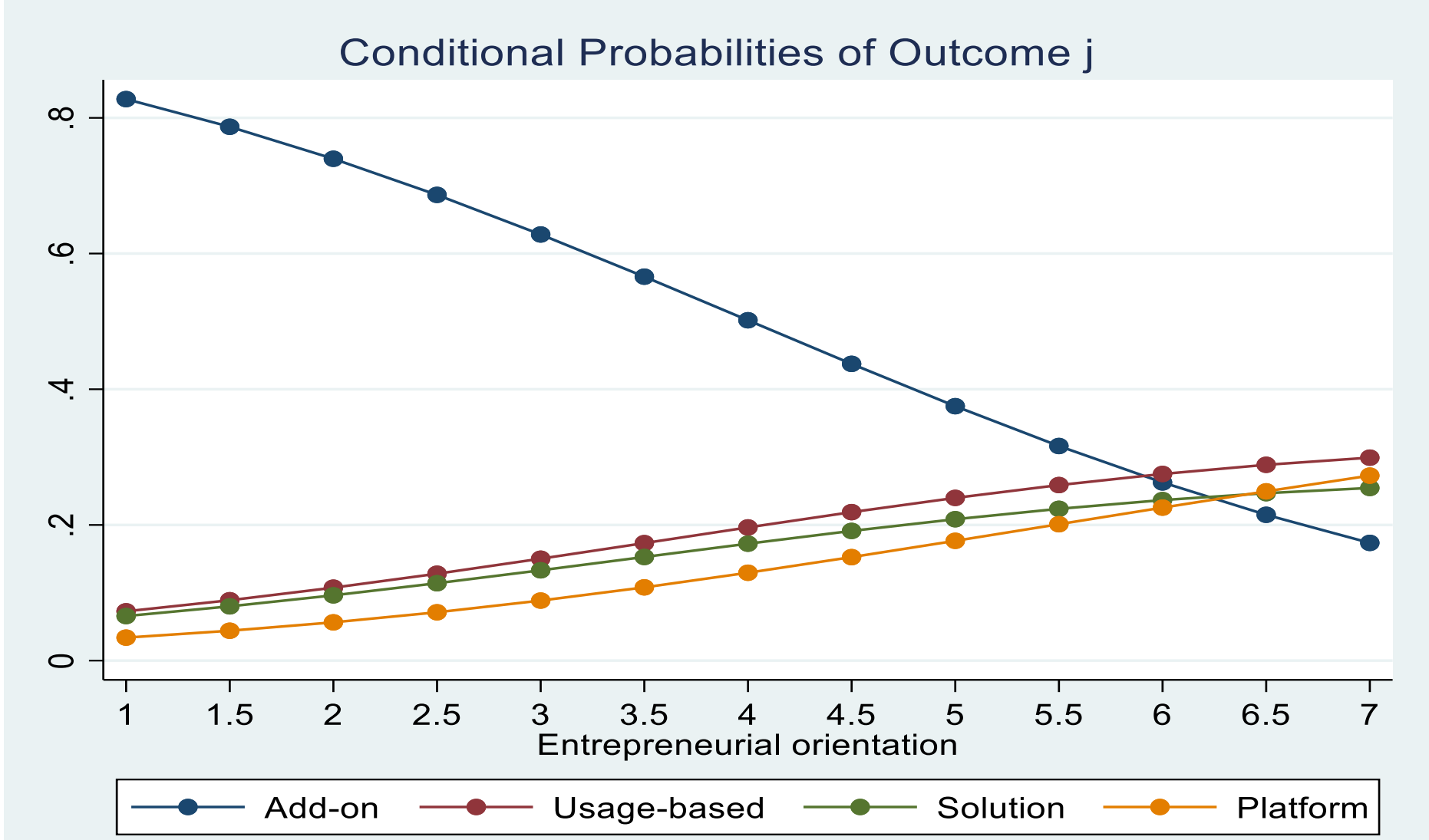
Entrepreneurial Orientation

Chi2(3)=13.24***



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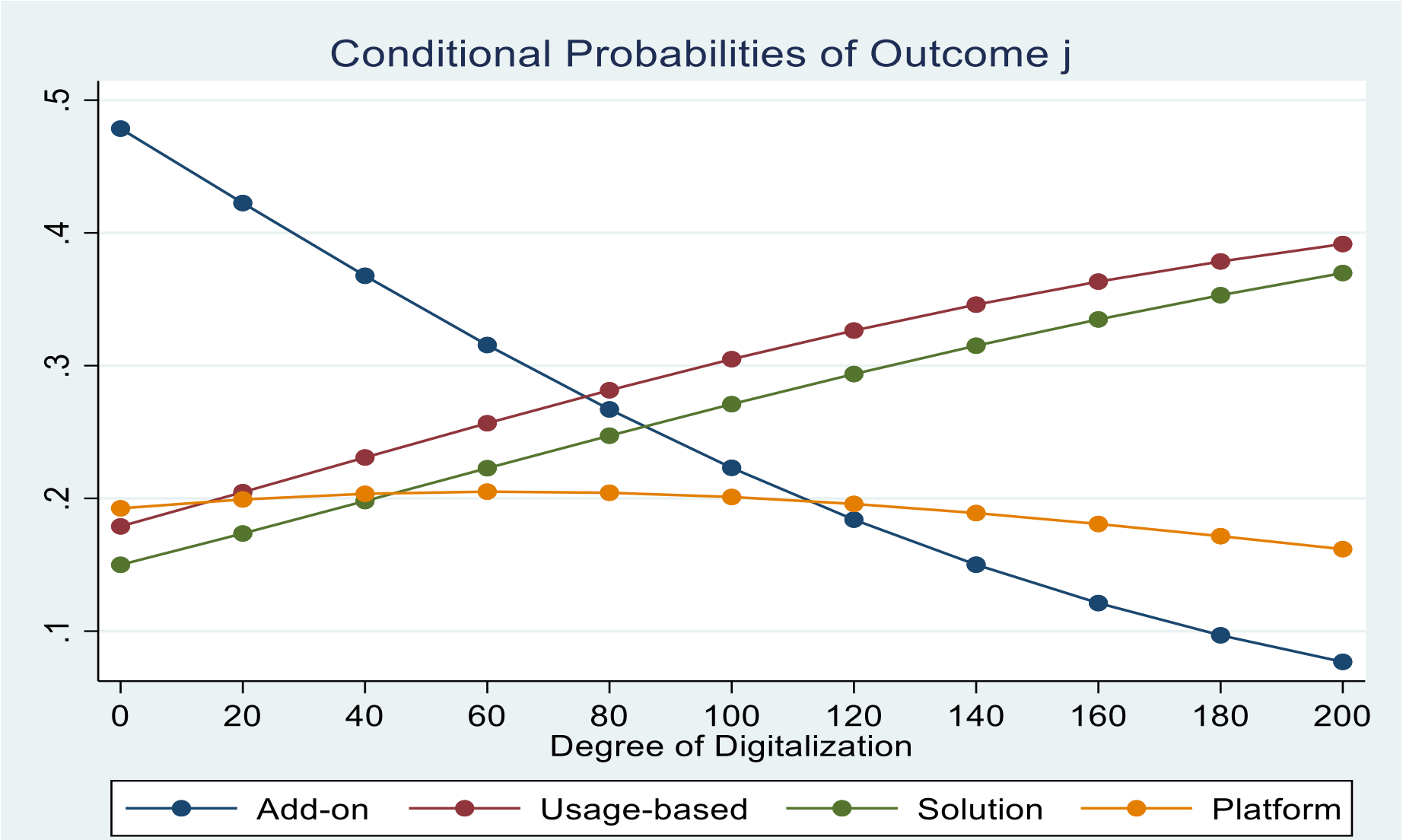
Digitalisation maturity

Chi2(3)=12.76***



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Implications

- Answering calls for:
  - Developing a quantitative measure of DS (and operationalising a BM typology
  - Large-N study
  - Focus on SMEs exclusively

- Next steps:
  - Compare performance across BMs, and identify configurations leading to superior performance (EUROMA 2023)
  - Construct one more sample (to compare and cross-validate)
  - Need to tease out the theoretical implications to the DS domain
  - Limitations (Qualtrics data…)

Thank you!

Please e-mail me:
1) for any comments, and/or;
2) if you want to be informed when the project report is out, and/or;
3) to be invited in a webinar we will host to disseminate our findings and ‘toolkit’ to SME practitioners.

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