

ENGLISH

CELTIC ADVANCED LIFE SCIENCE
INNOVATION NETWORK

CALIN

RHWYDWAITH GELTAIDD
ARLOESI GWYDDORAU
BYWYD UWCH



Swansea University
Prifysgol Abertawe

ORGANISATIONAL RESILIENCE & LIFE SCIENCE ENTERPRISE OPEN INNOVATION



The work described herein was a collaboration between Swansea University and the Celtic Advanced Life Science Innovation Network (CALIN), an Ireland-Wales 2014–2020 programme part funded by the European Regional Development Fund through the Welsh Government.

In Spring 2022, a survey regarding the above two themes was promoted to CALIN enterprises. It captured data from 76 life science small-to-medium enterprises, from the Republic of Ireland and Wales, and mainly within the subsector of medical technology.

This handout summarises the outcomes of this academic research for industry impact, and supports CALIN's vision to influence new-to-business policies and processes within their partner enterprises.

RESEARCH THEME ONE: ORGANISATIONAL RESILIENCE

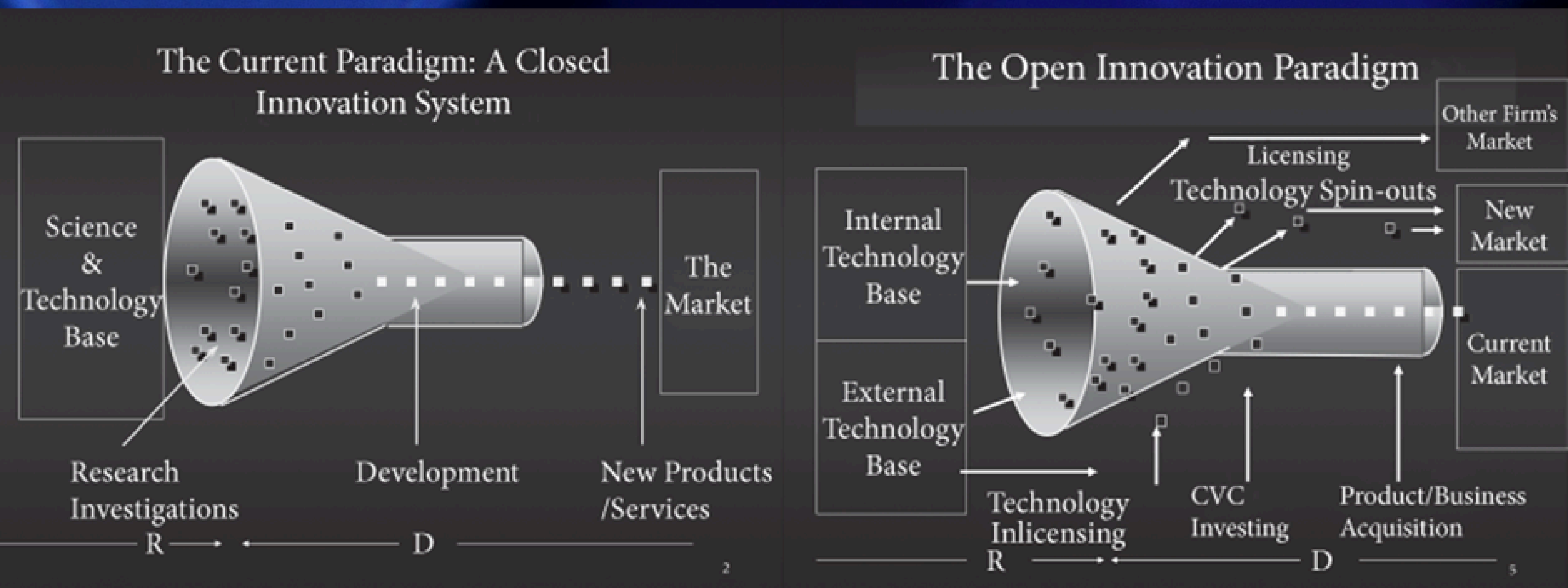
“The ability of an organization to anticipate, prepare for, respond and adapt to incremental change and sudden disruptions in order to survive and prosper” (British Standards Institute; see figure below sourced from their blog by Mehmi).



Pescaroli et al. (2020) proposed a four-tier resilience framework to measure this theme, from no to high resilience. Using this, the sampled enterprises from Republic of Ireland and Wales perceived themselves to have a medium level of organisational resilience, which matches the UK average.

RESEARCH THEME TWO: LIFE SCIENCE ENTERPRISE OPEN INNOVATION

“A distributed innovation process based on purposively managed knowledge flows across organizational boundaries” (Chesbrough, 2019; see figures below).



Nilsson & Minssen (2018) proposed a framework of six tiers of openness, specific to the life science enterprises. The scale ranged from completely closed (internal only resources) to completely open (internal and external resources). Using this, the sampled enterprises from Republic of Ireland and Wales perceived themselves to practice a partially open model of innovation, which again, matches the UK average.

Following a review of current business management research, gaps in academic knowledge were identified to form the two following research questions. A structured, online survey was designed and shared by CALIN and other agencies for life science small-to-medium enterprises to answer those questions. The quantitative data was then statistically analysed using regressions.

WHAT IS THE *RELATIONSHIP* BETWEEN ORGANISATIONAL RESILIENCE AND LIFE SCIENCE OPEN INNOVATION?

A positive linear relationship was calculated between the two themes, meaning that they increase together: the more resilient your enterprise, the more open your innovation processes. However, there was a low statistical association connecting them. Due to the nuance and complexity of enterprises, a second phase of research was required, in the form of qualitative interviews. These have been conducted and currently being analysed. Please contact the researcher (2024671@swansea.ac.uk) for more information

WHAT ARE THE *INFLUENCES* OF ORGANISATIONAL RESILIENCE AND LIFE SCIENCE OPEN INNOVATION?

This research offers an original contribution to knowledge by uniquely combining the two research themes. For statistical testing. Variables found in the current peer-reviewed literature were tested in the survey for their influence against the two themes. The results may influence new-to-firm policies and procedures that enhance your enterprise along the two themes of this research.

The most influential factors of both research themes are:

1. ENVIRONMENTAL CONTEXT (PROXIMITY TO RESOURCES)
2. PORTFOLIO DIVERSITY
3. MANAGEMENT'S INDUSTRY EXPERIENCE
4. DEDICATED INNOVATION STAFF
5. AQUACULTURE SUBSECTOR

Whereas the least influential factors were:

1. ENTERPRISE AGE
2. AGRITECH SUBSECTOR
3. MANAGEMENT'S ENTREPRENEURIAL EXPERIENCE OF CONCURRENT ENTERPRISES
4. OUTREACH (INTERNATIONALISATION)
5. ANIMAL HEALTH SUBSECTOR

THANK YOU FOR YOUR PARTICIPATION AND INTEREST IN THIS RESEARCH.

This Irish and Welsh sample forms part of a wider UK sample, for the original doctoral research by Michael Winn, School of Management, Swansea University. The results are more comprehensively explained in upcoming publications.

Email: **2024671@SWANSEA.AC.UK**

Please cite this research as: **WINN (DUE 2023)**

Special thanks to everyone at CALIN for their help and support of this research collaboration.

REFERENCES

British Standards Institute (No Date) *Organizational Resilience*. Our Services. Available at: bsigroup.com/en-GB/our-services/Organizational-Resilience/

Chesbrough, H. (2019) *Open Innovation Results* (1st ed.). Oxford University Press.

Mehmi, J. (No Date) *How does Organizational Resilience link with Lean Six Sigma?* British Standards Institute. Available at: bsigroup.com/en-GB/blog/Lean-Six-Sigma-Blog/How-does-Organisational-Resilience-link-with-Lean-Six-Sigma/

Nilsson, N., & Minssen, T. (2018) Unlocking the Full Potential of Open Innovation in the Life Sciences through a Classification System. *Drug Discovery Today*, 23(4), 771-775. doi.org/10.1016/j.drudis.2018.01.002

Pescaroli, G., Velazquez, O., Alcántara-Ayala, I., Galasso, C., Kostkova, P., & Alexander, D. (2020) A Likert Scale-Based Model for Benchmarking Operational Capacity, Organizational Resilience, and Disaster Risk Reduction. *International Journal of Disaster Risk Science*, 11, 404-409. doi.org/10.1007/s13753-020-00276-9



CYMRAEG

CELTIC ADVANCED LIFE SCIENCE
INNOVATION NETWORK

CALIN

RHWYDWAITH GELTAIDD
ARLOESI GWYDDORAU
BYWYD UWCH



Swansea University
Prifysgol Abertawe

GWYTNWCH SEFYDLIADOL AC ARLOESI AGORED YM MENTER GWYDDOR BYWYD



Tionól Réigiúnach an Deiscirt
Southern Regional Assembly



Cláir Chistí Eorpacha Struchtúrtha
agus Infheistíochta na hÉireann
2014-2020

Cómhainithe ag Rialtas na hÉireann
agus ag an Aontas Eorpach



UNDEB EWROPEAIDD
EUROPEAN UNION



Llywodraeth Cymru
Welsh Government

**Cronfa Datblygu
Rhanbarthol Ewrop
European Regional
Development Fund**

Roedd y gwaith a ddisgrifir yma yn brosiect ar y cyd rhwng Prifysgol Abertawe a Rhwydwaith Arloesi Celtaidd ar gyfer y Gwyddorau Bywyd Uwch (CALIN), sef rhaglen Iwerddon-Cymru 2014–2020 a ariannwyd yn rhannol gan Gronfa Datblygu Rhanbarthol Ewrop drwy Lywodraeth Cymru.

Yng ngwanwyn 2022, cafodd arolwg ynglŷn â'r themâu uchod ei hyrwyddo i fentrau CALIN. Casglwyd data gan 76 o fentrau gwyddor bywyd bach i ganolig, o Weriniaeth Iwerddon a Chymru, yn bennaf (ond nid yn gyfan gwbl) o fewn yr is-sector technoleg feddygol. Roedd busnesau o Gymru a Gweriniaeth Iwerddon o'r farn bod ganddynt lefel ganolig o wytnwch sefydliadol, sy'n cyd-fynd â chyfartaledd y DU.

Mae'r daflen hon yn crynhoi canlyniadau'r ymchwil academaidd o ran effaith ar ddiwydiant, ac mae'n cefnogi gweledigaeth CALIN i ddylanwadu ar bolisiau a phrosesau 'newydd-i-fusnes' o fewn eu mentrau partner.

THEMA YMCHWIL UN: GWYTNWCH SEFYDLIADOL

"Gallu sefydliad i ragweld, paratoi ar gyfer, ymateb ac addasu i newid graddol ac amhariadau sydyn er mwyn goroesi a ffynnu" (Sefydliad Safonau Prydeinig; gweler y ffigwr isod sy'n dod o'u blog gan Mehmi).

Awgrymodd Pescaroli et al. (2020) fframwaith gwytnwch pedair haen i fesur y thema hon, o ddim byd i wytnwch uchel. Roedd busnesau o Gymru a Gweriniaeth Iwerddon o'r farn bod ganddynt lefel ganolig o wytnwch sefydliadol, sy'n cyd-fynd â chyfartaledd y DU.

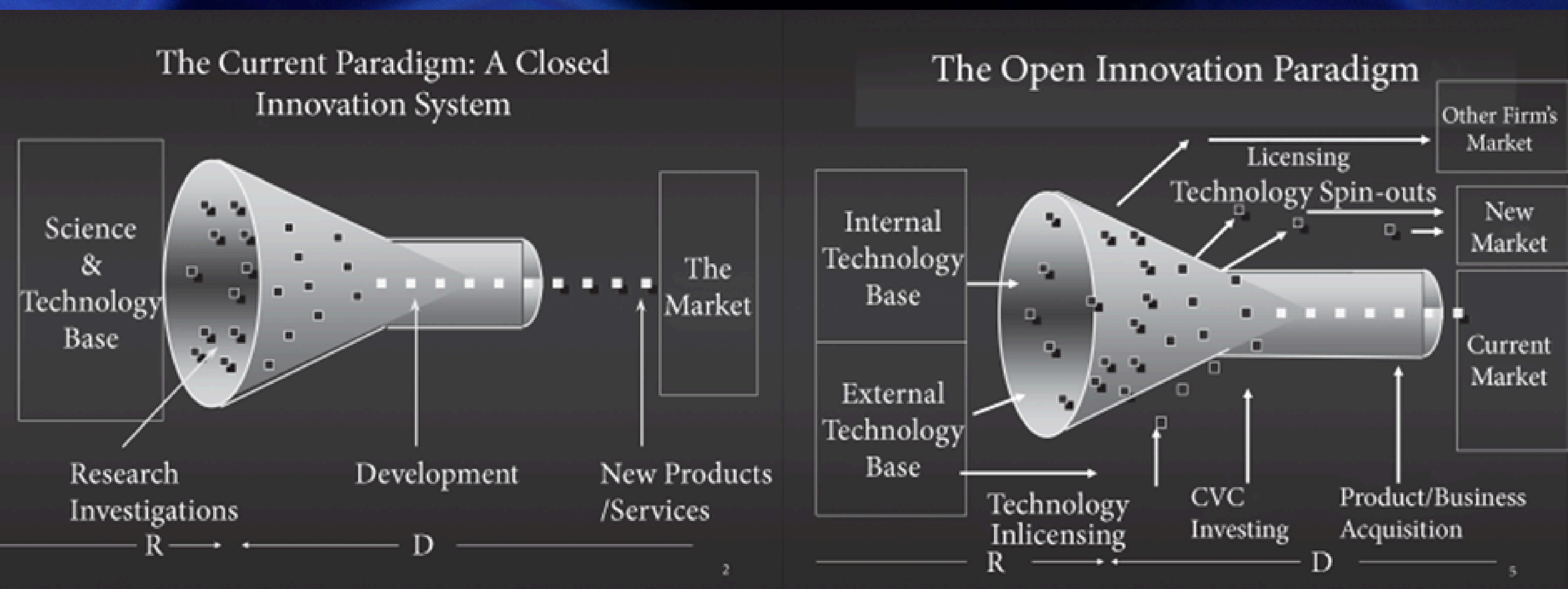


THEMA YMCHWIL DAU: ARLOESI AGORED YM MENTER GWYDDOR BYWYD

“A distributed innovation process based on purposively managed knowledge flows across organizational boundaries” (Chesbrough, 2019; gweler y ffigyrau isod).

Cynigiodd Nilsson a Minssen (2018) fframwaith chwe haen o fod yn agored, sy'n benodol i'r mentrau gwyddor bywyd.

Roedd y raddfa'n amrywio o fod yn hollol gaeedig (adnoddau mewnol yn unig) i fod yn hollol agored (adnoddau mewnol ac allanol). Roedd busnesau o Gymru a Gweriniaeth Iwerddon o'r farn eu bod yn gweithredu model arloesi rhannol agored, sydd unwaith eto'n cydfynd â chyfartaledd y DU.



Yn dilyn adolygiad o'r ymchwil presennol i reolaeth busnes, nodwyd bylchau mewn gwybodaeth academaidd er mwyn ffurfio'r ddau gwestiwn ymchwil canlynol. Cafodd arolwg strwythuredig ar-lein ei lunio a'i rannu gan CALIN ac asiantaethau eraill er mwyn i fentrau gwyddor bywyd bach-i-ganolig allu ateb y cwestiynau hynny. Yna dadansoddwyd y data meintiol yn ystadegol gan ddefnyddio atchweliadau.

BETH YW'R BERTHYNAS RHWNG GWYTNWCH SEFYDLIADOL AC ARLOESI AGORED YNG NGWYDDOR BYWYD?

Cyfrifwyd perthynas linol bositif rhwng y ddwy thema, sy'n golygu eu bod yn cynyddu gyda'i gilydd: po fwyaf gwydn eich menter, mwyaf agored eich prosesau arloesi. Fodd bynnag, roedd diffyg perthynas ystadegol i'w cysylltu nhw. Oherwydd arlliw a chymhlethdod busnesau, mae hyn yn gofyn am ymchwil bellach.

BETH SY’N DYLANWADU AR WYTNWCH SEFYDLIADOL AC ARLOESI AGORED YNG NGWYDDOR BYWYD?

Yn yr arolwg, profwyd newidynnau a ganfuwyd yn y llenyddiaeth bresennol a adolygir gan gymheiriaid am eu dylanwad yng nghyd-destun y ddwy thema. Gall y canlyniadau ddylanwadu ar bolisiau a gweithdrefnau ‘newydd-i-gwmni’ sy'n gwella'ch menter mewn perthynas â dwy thema'r ymchwil hon.

Ffactorau mwyaf dylanwadol y ddwy thema ymchwil yw:

1. CYD-DESTUN AMGYLCHEDDOL (AGOSRWYDD AT ADNODDAU)
2. AMRYWIAETH PORTFFOLIO
3. PROFIAD DIWYDIANNOL RHEOLWYR
4. STAFF ARLOESI YMRODDEDIG
5. IS-SECTOR DYFRAMAETHU

A'r ffactorau lleiaf dylanwadol oedd:

1. OED Y BUSNES
2. IS-SECTOR AMAETH-DECHNOLEG
3. PROFIAD ENTREPRENEURAIDD RHEOLWYR O FUSNESAU CYFAMSEROL
4. ALLGYMORTH (RHYNGWLADOLI)
5. IS-SECTOR IECHYD ANIFEILIAID

DIOLCH AM EICH CYFRANOGIAD A'CH DIDDORDEB YN YR YMCHWIL HON.

Mae'r sampl hon o Iwerddon ac o Gymru yn rhan o sampl ehangach y DU, fel rhan o ymchwil wreiddiol gan Michael Winn ar gyfer ei ddoethuriaeth yn Ysgol Reolaeth, Prifysgol Abertawe. Felly, dyfynnwch yr ymchwil hon fel:
WINN (DISGWYLIR 2023)

Diolch arbennig i Sally-Anne Gates a Dr Nour Al-Kafri yn CALIN am eu cymorth a'u cefnogaeth i'r ymchwil ar y cyd.

CYFEIRIADAU

Sefydliad Safonau Prydeinig (Dim dyddiad) Organizational Resilience. Our Services. Ar gael yn: bsigroup.com/en-GB/our-services/Organizational-Resilience/

Chesbrough, H. (2019) *Open Innovation Results* (1st ed.). Oxford University Press.

Mehmi, J. (No Date) *How does Organizational Resilience link with Lean Six Sigma?*
Sefydliad Safonau Prydeinig. Ar gael yn: bsigroup.com/en-GB/blog/Lean-Six-Sigma-Blog/How-does-Organisational-Resilience-link-with-Lean-Six-Sigma/

Nilsson, N., & Minssen, T. (2018) Unlocking the Full Potential of Open Innovation in the Life Sciences through a Classification System. *Drug Discovery Today*, 23(4), 771-775.
doi.org/10.1016/j.drudis.2018.01.002

Pescaroli, G., Velazquez, O., Alcántara-Ayala, I., Galasso, C., Kostkova, P., & Alexander, D. (2020) A Likert Scale-Based Model for Benchmarking Operational Capacity, Organizational Resilience, and Disaster Risk Reduction. *International Journal of Disaster Risk Science*, 11, 404-409. doi.org/10.1007/s13753-020-00276-9