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Roadmap for Renewal

A Shared Platform in the Food Industry

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Roadmap for Renewal: A Shared Platform in the Food Industry

Abstract

The majority of digital platform research has focused on consumer-centric platforms. Driven by the vast growth potential of direct consumer market access, industrial communities locked behind the conventional gatekeepers in their respective value chains have lately started to tinker with their own platform creation initiatives. Aided by fifteen food industry actors, we identify two critical managerial prerequisites for and design a six-step roadmap towards a participatory infrastructure platform – a platform that allows platform participants to share proprietary data and – by exploiting the data – to create new artifacts in consumer-centric marketplaces. Beyond product innovations, sharing data also enables new optimization layers for operational efficiencies and increased productivity on the industry level. In exploring the participants' commitment and willingness to shift towards such a platform model, we found three operational data types that the companies would readily be willing to share: 1) transportation data, 2) warehousing data, and 3) demand/supply data managed with decentralized governance models. In the short term, each data type could provide the foundation for the establishment of a specific type of an operational platform: a transportation platform, a warehousing platform, or a market platform. The latter would provide the long-sought direct access to consumer markets. Building on these models, we identify another three strategic avenues for long-term joint development: 1) algorithmic development and evolution of the platform, 2) cross-industry interoperability of the platform, and 3) interoperability with competing platforms. Laying out a roadmap of evolving platform models towards a consumer-driven business ecosystem, we contribute to the empirical literature on industrial platform creation.

Key words: Platform, e-commerce, multi-sided markets, food industry

JEL: L6, L66, L8, L81, L86

Uudistumisen askeleet elintarvikealalle alustataloudessa

Tiivistelmä

Kuluttajakeskeiset liiketoiminta-alustat ovat viime aikoina saaneet tutkimuksessa paljon huomiota osakseen. Myös perinteisten arvoketjurakenteiden kahlitsemat teollisuuden alat ovat sittemmin kiinnostuneet alustamallin toiminnallisuuksista, jotka mahdollistavat suoran pääsyn kuluttajamarkkinoille. Viidentoista elintarvikealan yrityksen auttamana tunnistamme kaksi keskeistä perusedellytystä, jotka jokaisen digitaalisessa alustaympäristössä toimivan yrityksen tulee täyttää. Lisäksi rakennamme kuusivaiheisen tiekartaston kohti avointa, kuluttajakeskeistä liiketoiminta-alustaa, joka mahdollistaa vapaan tiedonjaon alustalla toimivien organisaatioiden välillä. Avoin data kiihdyttää kuluttajalähtöisten innovaatioiden synnyttämistä ja mahdollistaa koko arvoketjunlaajuisten logistiikkaprosessien optimoinnin reaaliajassa. Alustan toimivuus vaatii määritelmällisesti vapaata tiedon jakoa osallistujien kesken. Tarkasteltaessa yritysten valmiuksia jakaa omaa tietoa tunnistettiin kolme tietoluokkaa, joihin yritykset suhtautuvat jo tällä hetkellä avoimesti: 1) kuljetustieto, 2) varastotieto ja 3) kysyntä-/tarjontatieto, jota hallittaisiin hajautetusti. Nämä kolme tietoluokkaa voisivat kukin toimia pohjana omanlaisensa alustan perustamiselle: kuljetus-, varasto- tai markkina-alustalle. Viimeksi mainittu mahdollistaisi kaivatun suoran pääsyn kuluttajarajapintaan. Pitkällä aikavälillä näitä alustoja voidaan kehittää yhä automatisoidummiksi ja kokonaisvaltaisemmiksi. Raportissa tunnistetaan kolme jatkokehitykseen soveltuvaa alustamallia: 1) algoritmisesti kehittyvä alusta, 2) poikkitoimialainen alusta ja 3) alustojen alusta, joka mahdollistaa keskenään kilpailevien alustojen yhteistoiminnan saman rajapinnan kautta. Tiekartta kohti kuluttajaohjattua, avointa liiketoiminta-alustaa syventää alustojen kehitystä empiirisesti tutkivaa kirjallisuutta.

Asiasanat: Alusta, verkkokauppa, monisuuntaiset markkinat, ruokateollisuus

JEL: L6, L66, L8, L81, L86

Tiivistelmä ja tiekartta (Executive Summary in Finnish)

Tiekartta kohti kuluttajalähtöistä, avointa alustamallia elintarvikeketjun uutena rakenteena

Tämä raportti esittää strategisen tiekartan ja siihen sisältyviä toimintaehdotuksia asiakaslähtöisen, digitaalisen alustamallin rakentamiseksi suomalaiselle elintarvikealalle. Olemassa olevat, jäykähköt arvoketju- ja ohjausrakenteet alkutuotannon, elintarviketeollisuuden, logistiikan ja päivittäistavarakaupan välillä eivät nykymuodossaan mahdollista kuluttajaohjautuvuuden toteutumista. Koko elintarvikeketjun tulevaisuuden kasvun näkökulmasta kuluttajaohjautuvuus ja sen hyödyntäminen lisäarvon tuotannossa on yksi keskeisimmistä kilpailutekijöistä ulkomaisen tarjonnan alati vahvistuessa eri kanavien kautta. Alustamallin mukainen toiminta rikkoo jäykkiä rakenteita ja mahdollistaa eri toimijoille suoran pääsyn kuluttajarajapintaan.

Tiekartta kohti toimivaa alustamallia yhdistelee kansainvälisestä, alustaliiketoimintaa luotaavasta kirjallisuudesta poimittuja löydöksiä ja suomalaisilta elintarvikeketjun toimijoilta saatua suoraa palautetta näiden valmiuksista toimia alustamallin mukaisessa liiketoimintaympäristössä. Näin tiekartta synnyttää käytännönläheisen, toimijoita yhdistävän ylätason näkemyksen toimivan alustamallin

- teollisesta rakenteesta,
- toiminnallisista ominaisuuksista,
- alakohtaisesta liiketoimintapotentiaalista,
- alustalla toimivien yritysten roolituksesta,
- teknisistä ja teknologisista ratkaisuista,
- tarvittavista sovelluksista ja
- tiedon- ja datan jakoon liittyvistä periaatteista.

Elintarvikeketju on valittu hyvistä syistä alustamallin kehitysympäristöksi. Valtioneuvoston kanslian selvityksen mukaan (VNK, 2017) ketjun rakenne on yksi suomalaisen elinkeinoelämän jäykimmistä ja suljetuimmista. Myös maa- ja metsätalousministeriö on havainnut poteroitumiseen liittyvät ongelmat ja on valmistelemassa syksyn 2017 aikana elintarvikemarkkinalakia, joka tähtää mm. tiedon avoimuuden ja jakamisen parantamiseen ketjussa[1]. Elintarvikeketju soveltuu jäykkyydestä johtuen oivallisesti radikaalien ja nykyrakenteita purkavien innovaatioiden synnyttämiseen. Tässä haasteellisessa ympäristössä kehitetyt, rakenteita notkistavat ratkaisut ovatkin siten helposti siirrettävissä myös muihin ympäristöihin. Ajoitus on otollinen, sillä elintarvikeketjussa toimivien yritysten tahto vapautua nykyrakenteiden kahleista on korkeampi kuin koskaan. Kasvua halutaan hakea nyt välittömämmästä kanssakäymisestä kuluttajan kanssa.

Alustamallista toivotaan kasvun kiihdyttäjää suoraa kuluttajarajapintaa kasvattamalla

Yrityksillä on vahvoja odotuksia alustamallin toiminnallisuudesta. Erityisesti sen tulee tarjota digitalisaation ja avoimen datan tuomia mahdollisuuksia vastata yritysten kasvu- ja liiketoimintamallien kehittämiseen liittyviin tarpeisiin. Alustan tulisi mahdollistaa samalla itse

[1] www.maaseuduntulevaisuus.fi%2Fpolitiikka%2Fmiksi-mekanismit-eiv%25C3%25A4t-voisi-olla-s%25C3%25A4%25C3%25A4d%25C3%25B6spohjaisia-suomeen-valmistellaan-kauppaa-valvovaa-ruoka-asiamiest%25C3%25A4-1.205030&usg=AFQjCNHcDSF7yzyzR-dOdZR20NjDOTMJ1IA (accessed 26.9.2017).

markkinoiden kasvu avaamalla tähän mennessä perinteisille toimintatavoille kannattamattomia markkinarakoja.

Kasvua haetaan kahden toisiaan tukevan kanavan kautta. Tärkein näistä on perinteistä korkeamman lisäarvon tuottaminen kuluttajalle. Tämä puolestaan vaatii entistä syvällisempää ja reaaliaikaisempaa ymmärrystä siitä, mitä kuluttaja milloinkin haluaa ja minkälaisilla tuote- ja palveluominaisuuksilla nämä halut voidaan tyydyttää. Alustan tulisi siis mahdollistaa toimivia työkaluja saavuttaa ja kohdata kuluttaja suorassa keskustelussa. Työkalut mahdollistavat jäykkien välikäsien vähentämisen elintarvikeketjusta. Kun alustalla toimivat tahot altistetaan suoraan kuluttajilta tuleville signaaleille, voidaan tarjontakin sopeuttaa nopeammin ja innovatiivisemmin kuluttajan eduksi.

Pitkälle vietynä alustamalli murentaa perinteisen arvoketjurakenteen täysin: Tehokkaat, paikalliset, hajautetut, älykkäät ja reaaliaikaiset logistiikkapalvelut tulevat korvaamaan perinteisen, keskitetyn ja historiadataan perustuvan ennakointitiedon varassa pyörivän, keskitetyn jakelumallin. Tämä radikaali toimintatavan muutos jakelussa ja ovelta-ovelle -logistiikassa parantaa erityisesti alkutuotannon sekä pienten ja keskisuurten tuottajien kasvunäkymiä. Näiden toimijoiden tuotantokapasiteetit ovat perinteisesti olleet liian pieniä palvelemaan valtamarkkinoita perinteisen markkinakanavan kautta.

Toinen kasvukanava on vienti. Viennin potentiaali kasvukanavana piilee siinä tosiasiassa, että kotimainen elintarvikemarkkina on pitkälti ylikypsä. Merkittävää kokonaismarkkinakasvua ei ole odotettavissa juuri yhdelläkään elintarvikesektorilla. Aitoa kasvua voi odottaa ainoastaan kehittämällä uusia kanavia vientimarkkinoille (VNK, 2017). Alustamallin odotetaankin avaavan suoria digitaalisia kanavia vientimarkkinoille innovatiivisten logistiikkapalveluiden siivittäminä. Lisäksi toimintamalli mahdollistaisi ulkomaisien kuluttajien tarpeiden kartoituksen alustan keräämän kuluttajadatan perusteella. Lopulta alustamalli voisi toimia myös itsessään vientituotteena tai -palveluna. Monet tämän päivän arvokkaimmista, globaaleista yrityksistä ovat alustaoperaattoreita, kuten Alibaba, Amazon tai Google. Nämä ovat itse asiassa parhaillaan laajentamassa toimintaansa logistiikkaan, joka on myös tämän raportin tulosten valossa yksi tärkeimmistä alustamallin toimivuuden peruspilareista.

Alustamalli tuo kasvun lisäksi myös kustannussäästöjä

Vaikka kasvu onkin ainoa kestävä strategia luoda arvonlisää pitkällä tähtäimellä, on yritysten lyhyellä aikavälillä säilytettävä myös kustannuskilpailukykynsä pysyäkseen pelissä. Dynaaminen ja sopeutettavissa oleva kustannusrakenne mahdollistaisi joustoja myös hinnoittelustrategioissa ja suojaisi liikevaihdon heilahteluilta kansantalouden epävarmoina aikoina. Yritykset toivovat siksi alustamallin tarjoavan uusia työkaluja kustannusrakenteen optimointiin. Kuluttaja- ja logistiikkatiedon avoimuus digitaalisilla alustoilla mahdollistaakin mm. kuljetusten järjestämisen suoraan kuluttajalle esimerkiksi joukkoistamisen ja muiden reaaliaikaisten kanavien välityksellä. Kun logistiikka irrotetaan riippumattomaksi palvelutuotannoksi, alentaa tämä alustalla tuotteitaan myyvien tuottajien kustannusrakennetta logistiikan osalta. Tätä suoraa kuluttajarajapintaa on perinteisesti palveltu hyvin keskitettyjen, suuryritysten hallitsemien kanavien välityksellä. Kanavat voidaan avata tai jopa korvata pienten ja keskisuurten yritysten innovatiivisille kuljetuspalveluille, joita yritykset kuten Wolt tai Piggy Baggy ovat tarjonneet kuvainnollisen laatikon ulkopuolelta.

Avoin, alustan välityksellä kerätty tieto auttaa alentamaan kustannuksia myös järkiperäistämällä turhat, kiinteisiin aikatauluihin sidotut kuljetukset. Kuljetuskaluston, tuotteiden, ja ohjausjärjestelmien kehittyessä itseään optimoiviksi osaavat ne järjestää kuljetuksien ajoituksen, reitityksen ja sisällön automaattisesti. Säästöjä saadaan lopulta aikaiseksi myös merkittävästi vähentämällä elintarvikehävikkiä, kun kysyntä ja tarjonta saadaan kohdennettua aikaisempaa huomattavasti reaaliaikaisemmin.

Yritykset ovat varovaisen valmiita jakamaan tietoa alustalle siirtyäkseen

Alustamallin mukainen toiminta vaatii mittavia muutoksia nykyisiin toimintamalleihin. Yrityksien tulee itse olla valmiita muuttamaan toimintatapojaan ja suhtautumistaan tietoon ja sen jakamiseen eri toimijoiden kesken. Yrityksiltä suoraan kysyttäessä valmiudet toimia täysin avoimella alustalla ovat vielä heikohkot. Tahtotila on kuitenkin vahva. Raportin taustalla toteutettu kysely ja sen tueksi tehdyt yrityshaastattelut paljastavat ensiaskeleet, jotka elintarvikeketjussa toimivat yritykset olisivat ensi tilassa valmiita ottamaan:

> Nykyinen kaupan hallitsema markkinatilanne ja USA:ssa voimakkaasti kehittyvä elintarvikekaupan digitalisaatio toimivat alkutuotannon ja elintarviketeollisuuden kannusteina kehittää uusia toimintamalleja. Yritykset ovat valmiita jakamaan dataa erityisesti sillä ehdolla, että data kerättäisiin alustatasolla tasapuolisesti ja se olisi kaikkien alustalla toimivien tahojen tasavertaisessa, avoimessa käytössä. Yritysten itsensä keräämästä, toimijakohtaisesta datasta sen sijaan oltaisiin valmiita jakamaan erityisesti logistiikkaan ja kuljetuksiin liittyvää dataa uusien yhteistyömallien kehittämiseksi ja pilotoimiseksi alustan välityksellä sille osallistuvien tahojen kesken. Tämä on lohdullinen löydös, sillä ilman valmiuksia datan jakamiseen olisi paraskin mahdollinen tulema kehitystyölle vain yhteinen käyttöliittymä toisistaan täysin erillisille, toimijakohtaisille verkkokaupoille. Esimerkiksi eri tuottajien tuotteita yhdisteleviä kauppakasseja olisi lähes mahdoton tilata tällaisessa ympäristössä.

Kysyttäessä yrityksiltä näiden näkemyksistä koskien alustamallin ohjausta, hallinnointia ja käytännön jalkautusta on suurin osa kiinnostunut jaetusta hallinnasta, oli kyseessä sitten mikä tahansa alustan osatoiminto. Valtaa alustasta ei haluta keskittää yksittäiselle toimijalle. Sen sijaan hyväksi hallinnointimalliksi nähdään sellainen, joka vapaasti kehittyy, kasvaa tai häviää alustalla toimivien tahojen menestyksen myötä, oli kyseessä sitten toimijat ruokateollisuudesta, kuluttajat, logistiikkatarjoajat tai jokin muu vielä odottamaton taho. Alustasta toivotaan toisin sanoen täysin vapaata markkinapaikkaa. Vaikka suurin osa yrityksistä äänestääkin jaetun hallinnan, demokraattisen päätäntäjärjestelmän ja avoimuuden puolesta, vain pieni osa uskoo, että alustaa ohjaavat periaatteet voisivat muodostua vapaasti toiminnan kautta. Toimintaperiaatteet tulee siis päättää yhdessä keskitetysti, jotta olemassa olevat epätasapainot markkinavoimissa eivät siirry sellaisinaan alustalle.

6-vaiheinen tiekartta osoittaa tien kohti poikkiteollista alustamallia

Alustaa rakennettaessa on tehokkainta seurata pienimmän vastarinnan polkua. Rakentaminen on siis hyvä aloittaa niistä toiminnallisuuksista, joihin osallistuvilla tahoilla on valmiiksi parhaat valmiudet. Tiedonjaon näkökulmasta nämä ovat korkeimmillaan logistiikkaan liittyvien ratkaisujen osalta.

Perusedellytykset – Ennen kehitystyön aloitusta kaikkien alustalle tähtäävien tahojen tulee kuitenkin täyttää kaksi perustavaa laatua olevaa ehtoa: jokaisen osallistujan tulee ensimmäiseksi digitoida kaikki alustalle tarjoamansa tuotteet ja palvelut; kuluttajan on pystyttävä tutustumaan tuotteistoon yhtä perusteellisesti kuin fyysisessä kaupassa. Toinen perusedellytys on, että jokainen osallistuja perustaa oman digitaalisen näyttelytilansa/verkkokauppansa, joka ensimmäisessä vaiheessa kytketään logistisin ratkaisuin kehitettävään alustaan ja sen muihin toimijoihin. Vasta kun nämä perusteet ovat kunnossa, on järkevää kehittää yhteistä logistiikka-alustaa. Ne tuovat yrityksille minimikyvykkyyden toimia digitaalisessa ympäristössä.

I Kuljetus-alusta – Kun minimikyvykkyydet ovat olemassa, voidaan aloittaa kuljetus-alustan rakentaminen. Jaetun kuljetus-, varasto- ja toimitustiedon päälle rakennetaan sovelluksia, jotka avoimesti seuraavat ja jakavat dataa kuljetettavan tavaran koosta ja painosta, nouto- ja toimituspaikkojen sijainneista, sekä toimitusta koskevista ehdoista (esim. kyläketjuvaatimukset etc.). Data on alustalla kaikille avointa, jolloin erilaisia kuljetuspalveluita tarjoavat yritykset ja henkilöt voivat vapaasti tarjota eräkohtaisia kuljetusratkaisuja heidän itsensä tarjoamaan hintaan. Kuluttaja voi tällöin valita itselleen sopivimman ja seurata toimitusta reaaliaikaisesti. Tässä vaiheessa kaupalla on vielä merkittävä rooli kuljetusvirtojen yhdistämisessä, tuotekategoriahallinnassa ja kuluttajahinnoittelussa. Se on siis tärkeä alustatoimija muiden joukossa.

II Varastointi-alusta – Logistiikka-alustan vakiinnuttua voidaan alustalle lisätä toiminnallisuuksia. Toisessa vaiheessa tämä on yritysten valmiuksien valossa todennäköisimmin varastoinnin, hyllytilan ja hinnoittelun hallinta. Voidaan puhua varastointi-alustasta. Tuotekategorioiden hallinta ja hinnoittelustrategioiden suunnittelu siirtyvät kaupalta tuottajille ja toimittajille. Kauppa siirtyy laskuttamaan tuottajia hyllyjensä kautta kulkevista tuotevolyymeistä transaktiopohjaisesti samalla kun tuottajat saavat itse päättää tarjoamistaan tuotekategorioista ja pyydetyistä kuluttajahinnoista. Tämä vapauttaa kaupan varastoon sitoutuneen pääoman riskistä ja antaa pienille tuottajille mahdollisuuden palvella pieniä markkinarakoja innovatiivisilla ja kokeellisilla tuotteilla.

III Markkina-alusta – Kun toimijat ovat oppineet omatoimisesti hallitsemaan tuotekategorioita ja hinnoittelemaan tarjontansa, voidaan siirtyä alustan kolmanteen kehitysvaiheeseen: markkina-alustalle. Markkina-alustalla jokainen osallistuja – alkutuottaja, jalostaja tai kauppias – voi myydä tarjontansa suoraan kuluttajalle alustan käyttöliittymän kautta. Kategoriahallinta ja hinnoittelu tapahtuvat suoraan alustalla. Tehokkaan, älyllistetyn ja reaaliaikaisesti kilpailutetun logistiikan vuoksi ei kaupan hyllyjä välttämättä tarvita jakelukanavana. Elintarvikkeet tuodaan suoraan kotiovelle; myös ne eheää kylmäketjua vaativat tuotteet. Kylmälaatikoita kuljetusten vastaanottoa ja säilytystä varten asennetaan jo tänä päivänä uusimpien asuinrakennusten yhteyteen. Markkina-alustan toteuttamiseen tarvitaan edellisten vaiheiden ratkaisujen lisäksi suoramaksutoiminnallisuuksia, alustaan kytkettyjä tuotannonohjaus- ja hallintasovelluksia sekä näihin liittyviä, avoimia tiedonjakoratkaisuja, jotka perinteisessä elintarvikeketjussa ovat rakentuneet yrityskohtaisesti jalostajan ja kaupan toimijoiden välille.

IV Algoritmisesti optimoitava alusta – Markkina-alustalla syntyy valtavia määriä dataa kuluttajaprofiileista, kulutustrendeistä, niiden maantieteestä ja ajoituksesta, kuljetusten reittivalinnoista, niissä käytettyjen välineiden käyttöasteesta ja resurssitehokkuudesta, tuotannon hävikistä ja tuhansista muista suureista, joita optimoimalla alustatoimintaa voidaan kehittää kohti parempaa asiakaskokemusta ja resurssitehokkuutta. Kokonaisuutta ei voida hallita ja op-

timoida tehokkaasti alustalla toimivien yritysten ja kuluttajien omilla, erillisillä tieto- ja ohjausjärjestelmillä. Kokonaisuuden ohjaukseen tarvitaan yhtenäinen ohjausinfrastruktuuri, joka itseoppivilla algoritmeilla auttaa optimoimaan koko alustan ja sillä operoivien toimijoiden toimintaa. Perusvaatimuksena algoritmisesti optimoidulle alustalle on yhteisesti sovittu datastandardi, jossa toimijoiden luovuttaman tiedon muoto, laatu, laajuus, sisältö ja muut tiedon yhtenäistämiseen tarvitut tietosuureet on määritelty yhtenäisesti.

V Poikkiteollinen alusta – Kuluttajan näkökulmasta on mukavaa keskittää ostokset yhdelle alustalle. Tällöin ei tarvitse vaihtaa alustoja ja käydä usein vielä läpi vaivalloinen maksamisprosessi, kun ruokakorin valinnan jälkeen haluaisikin varata vielä teatteriliput, lomamatkan tai ostaa lenkkikengät. Siksi alustan pitkäaikaisen menestymisen takaamiseksi tulee sille kehittää poikkiteollinen rajapinta, johon voidaan kytkeä elintarvikeketjun ulkopuolisia toimijoita. Algoritmisesti optimoitavan alustan ominaisuudet luovat hyvän pohjan sen laajentamiselle poikkiteolliseen ympäristöön. Tuote- ja palvelukirjon huomattavasti laajetessa on tiedon ja datan standardointiin panostettava merkittävästi lisää. Tämä merkitsee alustan rajaresurssien – ohjelmointirajapintojen, alustan sääntöjen, tiedon ja tuottojen jaon periaatteiden, etc. – avoimuuteen ja saatavuuteen panostamista. Poikkiteollisten toimijoiden houkuttelemiseksi tulee verkostovaikutusten olla tarpeeksi suuria; alustalla täytyy toisin sanoen olla valmiiksi tarpeeksi suuri määrä toimijoita – erityisesti kuluttajia ja tehokkaita logistiikkaratkaisuja tarjoavia toimijoita.

VI Alustojen alusta – Pitkällä aikavälillä on huomioitava, että alustoja tulee ajan myötä syntymään ympäri maailmaa monia erilaisia. Amazon, Apple, Alibaba ja Google ovat vain muutamia esimerkkejä jo kohtalaisen pitkälle viedyistä ja toimivista alustoista. Tästä johtuen pitkänaikavälin alustastrategiassa on otettava kantaa siihen, miten alusta mahdollistaa transaktioiden syntymisen eri alustojen välille. Myönteiset verkostovaikutukset kasvavat merkittävästi, kun asiakas voi vapaasti liikkua eri alustojen välillä piittaamatta näiden teknisistä tai käyttöliittymään liittyvistä ratkaisuista. Tänä päivänä alustat kuitenkin kilpailevat vielä verisesti keskenään. Eri tarjoajat kyllä vievät tuotteitaan ja palveluitaan yhtä aikaa monille eri alustoille (multi-homing), mutta alustat eivät ole vielä keskenään yhteensopivia. Palvelu- ja tuotetarjoajat joutuvat siis kehittämään tarjonnastaan useampia, alustakohtaisia versioita, mikä nostaa kustannuksia ja estää joitain tuomasta tarjontaansa kaikille olemassa oleville alustoille. Tämä puolestaan aiheuttaa päänvaivaa kuluttajarajapinnassa, kun kuluttaja joutuu valitsemaan alustojen eri tarjontojen välillä. Jos vapaa markkinadynamiikka ei kerran anna mahdollisuuksia alustojen yhteistoiminnalle, on esitetty perusteluja, että valtiolliset tahot voisivat edesauttaa yhteensopivuuden syntyä tarjoamalla kannustimia tai säätämällä toimiympäristön ehtoja.

Alustamalli hyödyttää elintarvikeketjun jokaista toimijaa

Suora pääsy kuluttajarajapintaan avaa täysin uusia mahdollisuuksia erityisesti alkutuotannon ja jalostavan teollisuuden toimijoille. Alustalla myös erittäin pienet ja paikalliset toimijat voivat pienistä tuotantomääristään huolimatta tuoda innovatiivisia tuotteita ja palveluita loppukäyttäjän ulottuville, kun perinteisen keskitetyn logistiikkamallin minimitoimitusmäärät eivät enää rajoita toimintaa ja tarve ylläpitää kalliita liiketiloja vähenee. Tuottajat voivat itse päättää tarjonnastaan, riippumattomasti testata markkinoilla innovaatioitaan, ja kokeilla erilaisia hinnoittelumalleja kuluttajarajapinnassa.

Koko elintarvikeketjun toimijat – erityisesti kaupan ala – voivat siirtyä sijoitetun pääoman näkökulmasta tehokkaampaan toimintamalliin, kun varaston hallinta ja tuotekategoriahallinta siirtyvät tuottajille. Veloitettaessa tuottajia varastojen käytöstä ja hyllytilan vuokrasta, pienenee niin sidotun pääoman kuin tuotteiden menekkiriski merkittävästi. Kauppa hyötyy myös kysynnän heilahteluiden ja trendien mukaan reaaliaikaisesti vaihtuvasta tarjonnasta, joka palvelee asiakkaita paremmin. Kustannussäästöjä syntyy myös huomattavasti pienemmästä henkilöstötarpeesta, kun perinteistä ostotoimintaa voidaan pienentää merkittävästi ja logistiikan sekä kategoriahallinnan tehtävät ulkoistetaan tuottajille tai alustalle.

Digitaalinen alustatoiminta palvelee kuluttajaa selkeästi yksilöllisemmin, kun erikoistuotteita voidaan tarjota entistä huomattavasti tehokkaammin fragmentoituneille asiakassegmenteille. Tämä saattaa osaltaan johtaa kokonaismarkkinan kasvuun, josta hyötyvät kaikki elintarvikeketju osapuolet kuluttaja mukaan lukien. Yksi merkittävimmistä eduista on kuitenkin se, että digitaalinen verkossa toteutettu alusta toimii jo määritelmällisesti maailmanlaajuisesti. Alustat ovat erinomainen kanava kehittää vientiä. Kotimaasta lähtöisin olevan alustan puuttuessa esimerkiksi Arla ja Valio suorittavat jo parhaillaan kokeiluja Amazonin alustalla UK:ssa. Etenkin rakentamalla alustojen välisiä kytköksiä, voidaan suomalaisia elintarvikkeita, jotka tällä hetkellä vielä ovat yksi suomalaisen vientisektorin heikoimmista kategorioista, tulevaisuudessa tarjota kotimaan rajojen ulkopuolelle.

1 Introduction

This report presents management implications and a strategic roadmap toward a consumer data-driven, digital platform model to disrupt inflexible and inefficient value chain structures among primary production, various industry sectors, logistics, retail, and service sectors in the food chain. The roadmap integrates findings from cutting-edge literature on digital market concepts with direct feedback from companies along the entire food chain, establishing a shared vision of the platform's

- industrial structure,
- functional properties,
- sector-specific business potential,
- roles of participants,
- technological solutions,
- application interface, and
- principles for sharing data.

The Finnish food chain has been chosen as a pilot context for specific reasons[2]. According to recent research (VNK, 2017), the food chain is characterized by one of the most rigid and closed value chain structures in the economy. As such, it lends itself fittingly to testing out radical, disruptive value chain innovations. Insights and models developed in this challenging context are easily transferrable into contexts of lower structural resistance. The timing is highly opportune, as the will among businesses in the food chain to break with incumbent value chain structures and explore more consumer-driven strategies is higher than ever.

The active participation of businesses has come with concrete demands regarding the platform concept. Above all, the concept has to address the needs of business to better exploit opportunities offered by digital and open data for streamlining business models and grow the total market for food products and services.

Growth is to be achieved through two mutually complementary avenues. First, consumers have to be offered higher value added than in the conventional context. This, in turn, calls for deeper than before insights into consumer needs and the product features that address them[3]. Therefore, the concept development work aims to envision new, direct practices for reaching out to and encountering the consumer. By way of these practices, the number of intermediaries along the food chain is to decrease, and the newly emerging value chain structure is to be more nimble and adaptive; every participant of the open platform is to be directly exposed to signals from the consumer base.

In fact, with the establishment of the platform as the new market structure, the concept of the conventional value chain might disappear entirely as efficient, local, distributed, smart real-time logistics services rise to replace centralized logistics solutions. This paradigm shift in distribution and last mile logistics would greatly improve growth prospects in primary pro-

[2] For other motives see, e.g., *Amazon and Whole Foods Market Announce Acquisition to Close This Monday, Will Work Together to Make High-Quality, Natural and Organic Food Affordable for Everyone*; http://media.wholefoodsmarket.com/news/amazon-and-whole-foods-market-announce-acquisition-to-close-this-monday-wil (information retrieved September 7, 2017).

[3] For the introduction of featured consumer needs, e.g., raw food, paleo, vegetarian, lacto vegetarianism, ovo vegetarianism, ovo-lacto vegetarianism, vegan, coeliac, gluten free, low carbohydrates, fitness, and other similar diets.

duction and the small and medium-sized enterprise sector, in particular. The volumes of these businesses are generally too small to gain access to mainstream markets through conventional retail, for instance.

The second avenue of growth, namely, exports, rests on the fact that growth of domestic markets in Finland is only marginal in many sectors of the economy. This is true for the food chain in particular. True growth can be expected only from the development of new channels to foreign markets (VNK, 2017). Therefore, the platform concept is hoped to provide improved access not only to export markets through logistical innovations but also to foreign consumer data for generating an understanding of the respective needs. Finally, it is to be considered how the platform as a concept itself could be exploited as an export product or service. Many of today's most valued, global businesses are platform operators such as Alibaba, Amazon and Google. In the Alibaba and Amazon cases, they are becoming a global logistics operator as well[4].

Growth is certainly the only sustainable strategy to generate value added in the long term, but companies must maintain their cost competitiveness in the short term to stay in the game. A dynamic cost structure provides for flexibility in pricing strategies and protection from volatile revenue streams in times of economic uncertainty. Firms, therefore, hope for platforms to provide new and flexible options for cost optimization.

Openness of consumer and logistics data on digital platforms allows for novel ways of organizing the transportation of goods directly to the buyer through crowd-sourced and other real-time mediated channels. This will lower the costs related to last-mile delivery for sellers on the platform. The direct buyer interface has conventionally been dominated by highly centralized delivery solutions of large corporations but can be opened up to innovative services provided by small and nimble companies – such as Finnish startups Wolt or Piggy Baggy – introducing tailored delivery concepts from outside the proverbial box.

Open platform data should allow for further cost reductions by reducing the amount of redundant deliveries based on rigid schedules as the delivery equipment, the respective control and management systems and the products to be delivered will be integrated through smart solutions and start coordinating the optimization of delivery timing, routes and volumes automatically. Finally, driven by real-time consumption data, these systems will also be able to reduce the amount of total wastage, as the demand and supply can be matched more effectively on consumer-driven platforms.

The report is structured as follows: Chapter 2 discusses the current state of industrial organization, highlighting key implications of conventional solutions, such as value chains, on the (in)ability of business sectors to provide value added innovations to the consumer. Chapters 3 and 4 introduce the central concepts of the digital platform model as an alternative to industrial organization. Chapter 5 leads in the empirical section of the report, describing the methodologies applied in the design process of the platform model developed in the study. Chapter 6 presents the results of a survey that sounds the readiness of different sectors of the food chain to transition into a platform paradigm. Chapter 7 lays out the strategic roadmap for such

[4] For more information, see "Changing the Ocean Shipping Game, Amazon, Alibaba, Maersk, and CMA CGM Leading the Way": http://www.supplychain247.com/article/changing_the_ocean_shipping_game_amazon_alibaba_maersk_and_cma_cgm (information retrieved September 7, 2017).

a transition, starting with the current status quo of industrial organization in the food chain and ending with a vision of the distant future known for open and distributed platforms as the dominant model of organization. Chapters 8 and 9 conclude the report, presenting managerial takeaways and potential benefits for firms intending to take the first steps toward a platform-based strategy.

2 From proprietary pipes to shared platforms

As digital platforms have taken center stage in the discussions on modern industrial organization, the discussions on how platform strategies could be harnessed to boost the firm's proprietary business have accelerated in executive boardrooms.

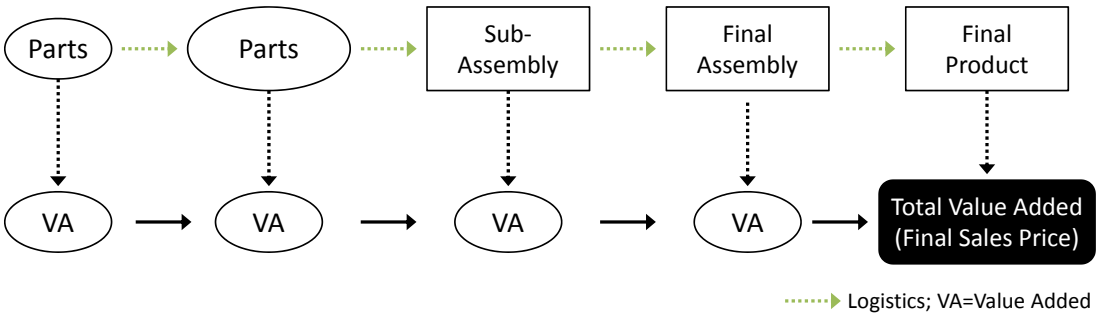
These deliberations may often have a nervous undertone, not only because the imminent strategic shift to platforms might push businesses out of their comfort zone but more so because platforms force them to give the concept of "proprietary" an entirely new meaning.

In an Intellectual Property (IP) dominated world, for decades, firms have been conditioned to anchor their business models in the ownership of assets – both tangible and intangible. They have further been conditioned to take full control of the value chain they operate in (see, e.g., Ali-Yrkkö, Rouvinen, Seppälä & Ylä-Anttila, 2011; Seppälä, Kenney & Ali-Yrkkö, 2014; Larsen, Seppälä & Ali-Yrkkö, 2017). In the era of platforms, these strategies have become strategic options; they are no longer prerequisites for value capture.

Before developing the argument in full in the next few chapters of this report, let us first pull back a little and revisit the question why platforms have come to challenge the conventional ways of organizing economic activity as we have known them for so long. We begin with the most fundamental concept of them all: the industrial value chain.

The classic value chain concept teaches that – in the absence of full integration of all functions within a single firm – products and services are introduced to markets as output to a process of consecutive and additive steps, each often performed by a separate company. In the case of products (Figure 2.1), the process usually begins with the extraction of raw materials, followed by the production of parts and their sub-assembly into components. These components are

Figure 2.1 The classic industrial value chain



Source: Seppälä, Kenney & Ali-Yrkkö (2014).

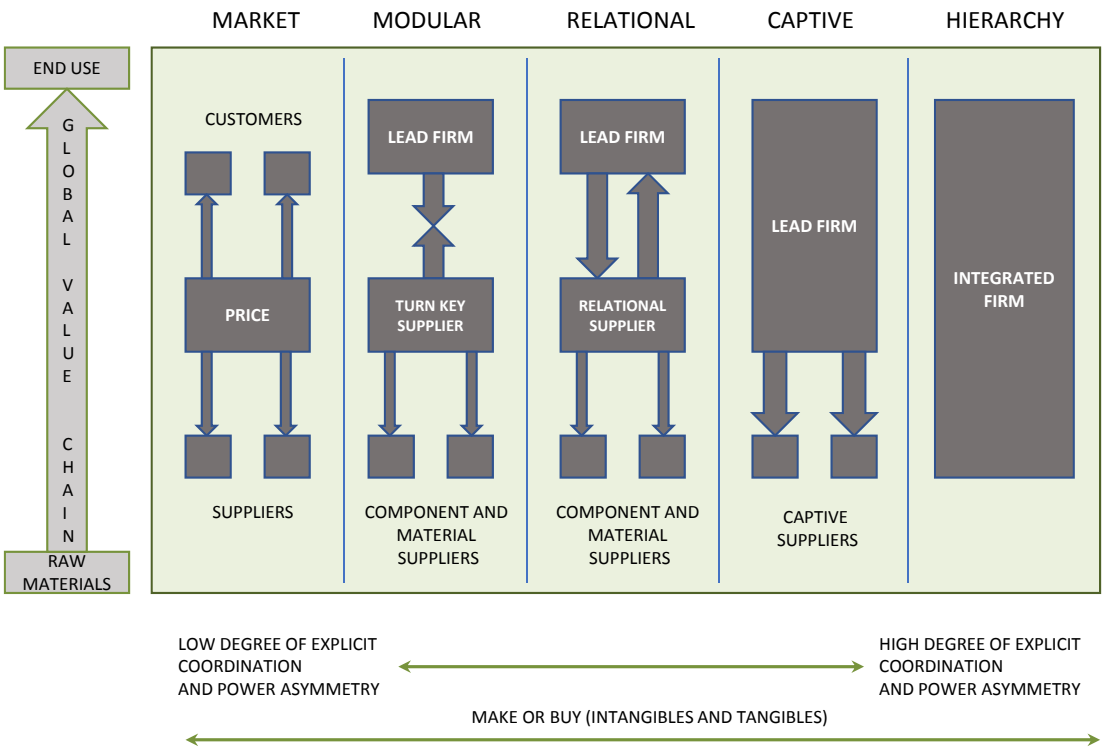
usually put together by an integrator before it is sold on markets as the final product. In each step along the process, the respective firms add value to the product by way of expending resources in the form of materials, labor, know-how, etc.

How much each firm is able to capture value from the process, in turn, depends on the strength of its position in the value chain. The position is usually a function of the power relationships between firms, which are usually reflected in the structure and governance type of the chain as depicted in Figure 2.2 (for more on the forms of governance in value chains see Gereffi, Humphrey & Sturgeon, 2014).

The more complex and the more mature an economic sector is, the more often it is characterized by a growing degree of power asymmetry. Relational and captive value chain governance models prevail in these sectors. The dominant position is usually held by a firm that rules over the immediate access to market.

In the mobile device markets, for instance, these are the consumer-branded device manufacturers such as Samsung, Apple, and Huawei. The relationships with component and sub-component suppliers are usually exclusive. Most of the technologies produced in these relationships are *proprietary* to the lead firm, leaving suppliers with limited freedom of movement and weak value capture capabilities.

Figure 2.2 Five global value chain governance types



Source: Gereffi, Humphrey & Sturgeon (2014).

In the Finnish food value chain, the governance model has been *relational* for decades. Lead firms in the highly concentrated retail sector have set consumer prices and made the decisions concerning product category management, essentially determining which products were allowed to be exposed to the markets and consumer demand.

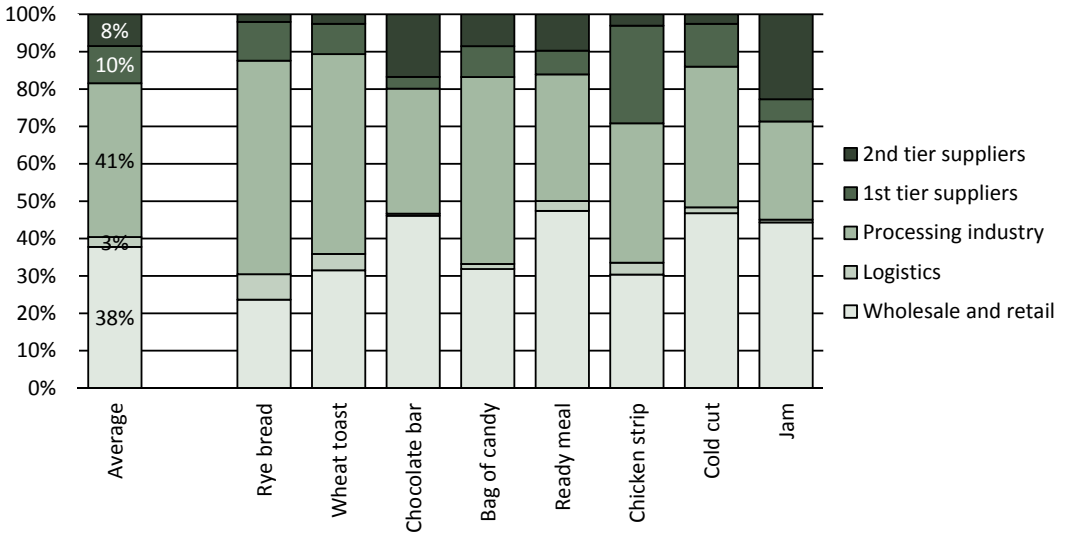
The oligopolistic food processing sector – the food industry – has supplied the retail sector with product and packaging innovations through regularly up-dated and re-negotiated long-term contracts but also through competitive bidding contests. The latter mechanism has often been applied in the retail sector's private label product categories. The relationships with the retail sector have not been exclusive. However, jeopardizing a relationship with just one of the two dominant retailers alone would have a considerable impact on the business of a single supplier.

The food processing sector, in turn, has acquired the necessary raw materials from primary production. Deals have been made either on open markets or through co-operative arrangements. The type of governance in these relationships has been highly dependent on the specific sub-sector. While grains have been subject to more open market mechanisms, milk, for instance, has been under the domain of large cooperatives.

Essentially, the food value chain is a classic, pipe-like structure, in which one instance procures inputs from the previous one based on bilaterally struck contracts. Governance in the pipe is determined by degree of control over market access and concentration of competition in each sector. Control over market access is therefore strongly protected by *keeping all vital data such as consumer preferences, demand geography and product-level purchase volumes strictly proprietary*.

The impact of the prevailing governance type in the pipe is reflected in the distribution of value as captured by its various sectors (Figure 2.3).

Figure 2.3 Share of total value added of various products by value chain segment



Source Ali-Yrkkö (2013) and ETLA (2017).

The figure clearly demonstrates how the two dominant sectors – retail and the processing industry – compete for shares of value created in the pipe. On average, the sectors split the share of value added evenly with each creating roughly 40 percent of the total.

2.1 E-Commerce and other omni-channel approaches aim to disrupt the pipe concept

In the perennial race for higher value capture, firms are constantly on the lookout for ways to break free from the dependence on proprietary down-stream market channels. The wider emergence of the World Wide Web and respective Internet browsers such as Mosaic and Mosaic-influenced Netscape Navigator in the 1990s was therefore seen as a welcome enabler for disrupting existing value chains.

To manufacturing and other classic supplier sectors, the Internet gave the promise of direct market access. The concept of e-commerce – trade through digital omni-channels – was born. Arrows in early flowcharts depicting the concept readily bypassed boxes labeled "retail" and, instead, directly pointed to the end user. Doom was spelled upon the retail sector in business schools and management magazines alike.

The transition to e-commerce, of course, has been much longer and harder than hoped for. Vital functions such as inventory management and scalable logistics, last mile delivery, effective return policies, and the display of goods – the strongholds of retail companies – were difficult to digitize. The burst of the digital bubble at the turn of the millennium attested to many failed endeavors to float a business in a digital environment.

Even today, with a few exceptions such as Alibaba, Amazon and Apple Store, most existing e-commerce efforts of many well-known brands still boil down to a web-based customer interface, an on-line store, that is built in parallel to the classic brick and mortar distribution channel. Behind the façade, the value chains, power relations and governance models still remain unchanged to a large extent. This is directly reflected in how data and information flows are pre-dominantly governed in today's value chains. Data are not openly shared but stored in internal, tailored information systems that are not only disconnected but also strongly protected from other participants in the value chain (Figure 2.4). Third parties are unable to tap into value chain–level data and provide innovative solutions to perceived issues.

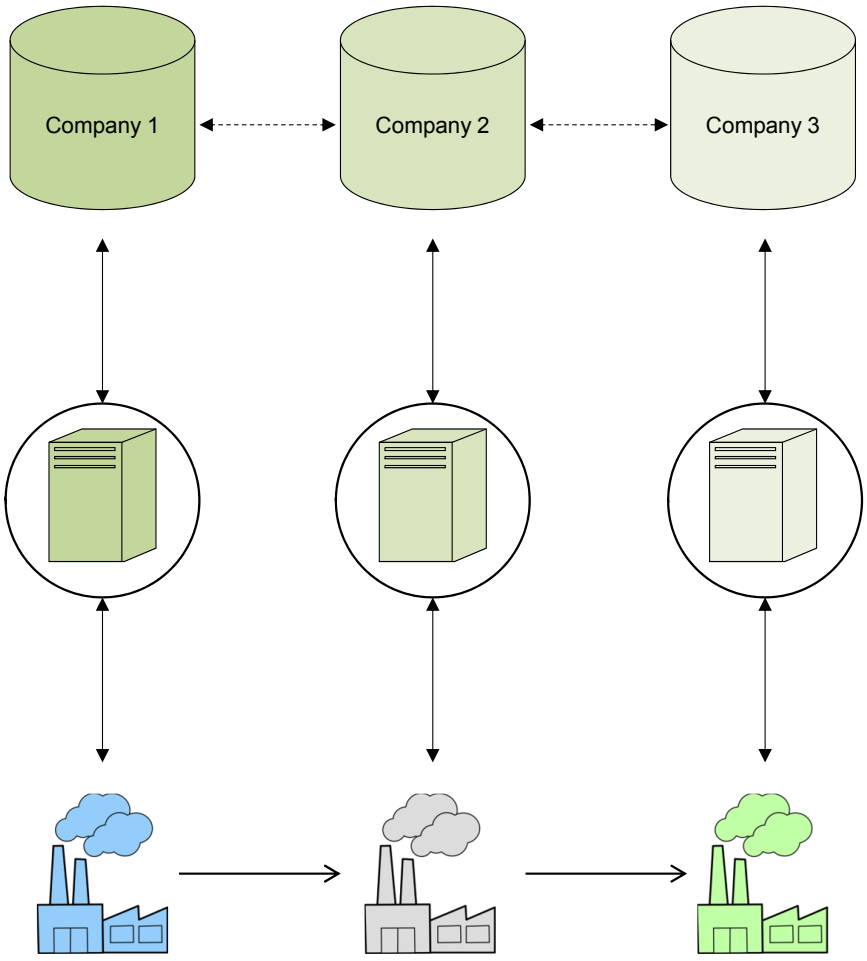
The food chain is no exception. In fact, it has been lagging other industries in its online presence. It makes no difference whether the focus is on primary production, the food industry or retail, online stores are scarce and few in regard to food. Since the 1990s, numerous retailers have launched online supermarkets, but only a few have succeeded in staking a long-lasting position among their more conservative competitors. Tanskanen, Yrjölä and Holmström (2002) confirm that online groceries are significantly more challenging to operate than traditional brick-and-mortar groceries. Lessons from early attempts are reflected in the following six insights.

First, contrary to numerous other online retail industries, **online grocery logistics require a certain density of customers and sales per geographical area in order to be effective**. As commodities, most food products have a relatively low profit margin, which makes them very sensitive to even slight increases in variable costs such as those related to logistics. Therefore, centralized, high-volume logistics solutions have prevailed.

Second, **trust and loyalty play a significant role in regard to food**. For logistical reasons, one customer purchasing 500 euros worth a month is more profitable than ten customers purchasing 50 euros worth a month. Satisfied repeat customers who purchase in large quantities are therefore valuable. In the absence of direct physical contact with the products before purchase, customer satisfaction is driven by trust between the seller and the customer. The role of trust is highlighted in fresh produce in particular, where the retailer selects the specific goods to be delivered for the customer.

Third, **an online grocery entrant needs to invest much capital before the business can be expected to break even**. Prices in the online store need to be comparable, if not cheaper, than in conventional supermarkets in order to entice customers away from their customary shopping outlets and into the online store. Thus, procurement prices play a crucial role in the sustainability of online stores. Established, large grocery retailers typically have larger bargaining power and smaller purchasing prices than small entrants. Thus, for an online entrant, capital is needed to subsidize high purchasing prices before larger volumes are reached.

Figure 2.4 Information and data structure in conventional industrial value chains



Source: Mattila, Seppälä & Holmström (2016).

Fourth, on a related note, **online grocery retailers need to pay attention to the general user-friendliness of the stores' ordering interface** as well as the convenient display and identification of goods. Suppliers need to offer detailed product information, since customers are not able to physically take a look at the product.

Fifth, **an online grocery requires operational efficiency**. Delivering goods on a day's notice will result in high customer satisfaction but is also much more expensive than delivering once a week, for instance. The operational efficiency can be improved by unattended delivery, for instance, but it requires refrigerated delivery boxes that still few apartments feature today.

Finally, when network effects and operational efficiency are established, th**e online retailer can leverage its logistics and loyal customers by expanding into other products and services**, such as higher mark-up non-grocery items or mail delivery.

To summarize, the break with conventional industry value chains has not been an easy one in any sector of the economy. Old power relationships and industry dynamics have been difficult to disrupt even when technology has offered the potential to bypass bottlenecks through new distribution channels. At the heart of the problem lies the fact that digitalization so far has failed to promote change in what truly determines a firm's position in value chains: its business model.

However, the last decade has seen the rise of the platform as a concept for new business model development. The subsequent two chapters explore the concept and its evolution.

3 Centralized platform strategies

Digital platforms are typically characterized by multi-sided markets – as defined shortly – and third-party innovation ecosystems that are rapidly changing the revenue and business models of many incumbent companies. Furthermore, these digital marketplaces and platforms are questioning the product, service and information technology architectures within and across traditional organizational and industry boundaries; traditional supply chains are no longer necessary as platforms directly broker transactions among the multitude of actors that have conventionally been locked in rigid positions in linear value chains. (Hagiu & Wright, 2014; Parker, Van Alstyne & Choudary, 2016).

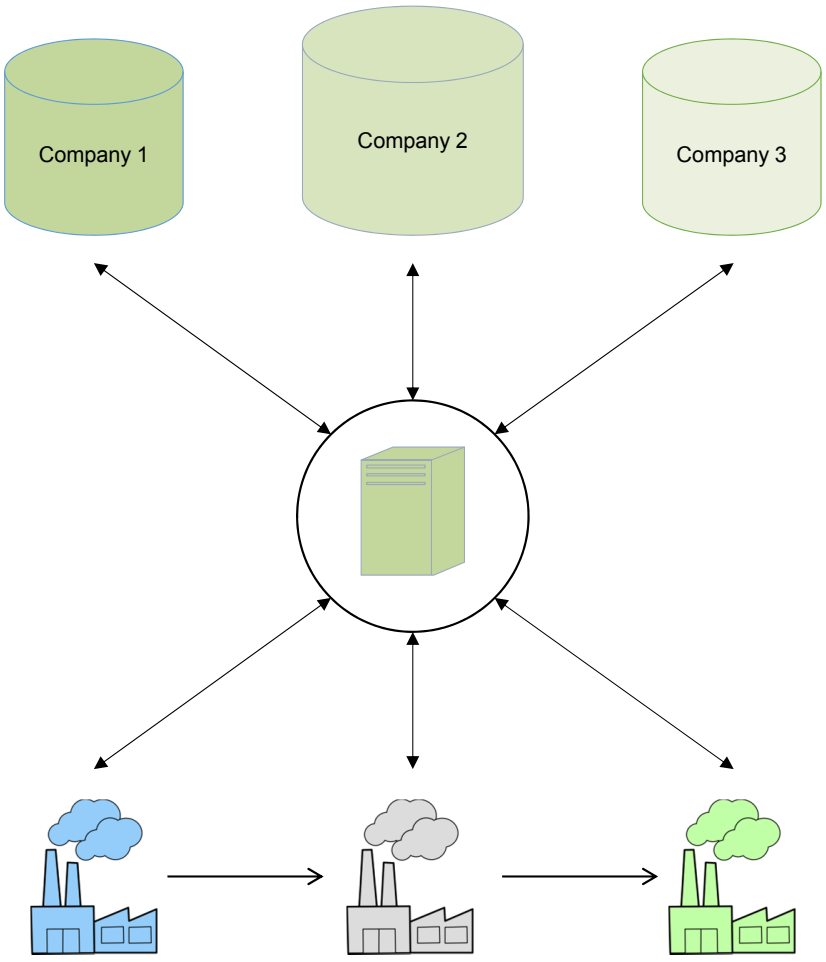
The Internet as an operating environment and mobile browsing as a convenient and fast user interface have had a central key role to play in this platform transformation (West & Mace, 2011; Pon, Seppälä & Kenney, 2015). Thanks to the transformative nature of platform-based revenue and business models, pioneering companies across different industry sectors can now take the leap from the widely prevalent concept of the proprietary and closed "intranet platform" toward a more open and shared platform concept (Pon, Seppälä & Kenney, 2014; Pon, Seppälä & Kenney, 2015).

Designing strategies for the transition toward shared platforms is increasingly relevant for any incumbent company in any industrial supply chain seeking to 1) secure their value creation and capture position, 2) reap the respective benefits of accessing and providing an access to the final markets, and 3) letting third parties distribute their products and services directly to consumers on those markets.

Owners of such marketplaces and platforms, in turn, have three vital goals: 1) addressing the needs of increasingly fragmented customer segments; 2) attracting onto the platform all the relevant supply chain participants both downstream and upstream; and 3) continuously removing market frictions on the platform. A key element of such marketplaces and platforms is to concurrently drive all three goals to achieve greater network effects between participants. As will be shown shortly, network effects are decisive for the success of the platform market concept. (Katz & Shapiro, 1994; Hagiu & Wright, 2015; Parker, Van Alstyne & Choudary, 2016).

Platforms, as will become clear with the progress of this report, are complex, multi-dimensional concepts that bend to concise taxonomies only with considerable difficulty. Establishing a functional platform taxonomy is therefore best approached one dimension at a time. Breaking up the concept into single dimensions allows for designing grounded, comprehensive and effective strategies that, once all dimensions have been accounted for, address all key aspects vital to managing platforms.

Figure 3.1 Centralized platform control structure



Source: Mattila, Seppälä & Holmström (2016).

In the centrally controlled platform economy as illustrated in Figure 3.1, the key dimensions of a digital marketplace and platform are as follows: 1) network effects; 2) complementarities; 3) multi-sided markets, 4) boundary resources, and 5) operational governance.

3.1 Defining platform characteristics[5]

Network effects[6]

In economics, network effects arise when the introduction of an additional participant into a network has an effect – positive or negative – on the value of partaking in the network as perceived by all existing participants. In the platform market context, network effects are central to the platform's success because the benefit accruing to a participant from using a digital platform depends on the number of other parties using the same platform. The relationship is positive: each new market side – be it a consumer or supplier of products and services – adds to the benefit enjoyed by the existing market sides; it increases the total value of the entire platform. A classic example of network effects at play is Facebook – its usefulness is very much determined by the number of market sides and people who can be reached through Facebook's applications. This is true for all participating market sides, including the consumers, advertisers, product and service providers, operators and Facebook itself.

Network effects can be divided into two main categories: *direct* and *indirect* effects. Direct network effects refer to the increase in the value of a good or service to a single user due to the increase in the number of other users. The effect is positive as long as the platform's technical capacity is not exceeded. However, the effect turns negative if the new users congest the system and thus create problems.

Indirect network effects refer to the provision of compatible and complementary products, services and applications. Increased demand for a specific product, service or application also leads to increased demand for the supply of complementary technologies and services. Consequently, one of the key performance indicators of a platform is how successful it is in persuading various parties to operate as part of a shared platform or network. It should be noted, however, that when a platform achieves a critical mass, it might restrict competition outside the network and complicate market entry by the platform actors.

Example 1: Apple

Apple, iPhone, its operating system iOS and their application marketplace constitute a platform owned, operated and controlled by Apple. The different sides of the marketplace, e.g., users and application developers, interact with one another though the platform. It generates massive direct and indirect network effects based on the number of different market sides, users and the useful products, services, and applications developed for it. The greater the number of users is, the more attractive it is to developers to create new services and applications. Conversely, the greater the number of interesting applications, the more users the platform attracts. It has also been discovered that the demand for applications increases when the platform permits in-app purchases and decreases when there is advertising.

[5] For more information about the platform characteristics in Finnish see Seppälä et al. (2015) and Ailisto et al. (2016).

[6] For more information on network effects and platforms see Parker, Van Alstyne & Choudary (2016, pp. 16–34).

Complementary assets[7]

The highest profits are earned when multi-sided markets and platforms are made accessible to *complementary third-party products, services and applications* that create value for their customers. The complementary asset holders cannot make the products, services and applications available to consumers without the platform (the applications cannot be used on other platforms) while at the same time they deliver significant added value to consumers not offered by the platform itself. Often, a product, service and application is replaceable by another nearly identical product, service or application, meaning that individual companies do not enjoy a dominant position even if a given product, service or application may be of greater value to consumers than some other product, service or application. In an ideally complementary situation, all the individual assets are always consumed at a given fixed ratio. For example, to row, you need a boat and two oars; to play pool, you need a pool table and 16 balls.

To ensure that the platform provider and third parties can benefit from one another, the assets offered by third parties are typically complementary to each other so that they produce direct and indirect positive network effects. Consequently, the platform provider seeks to attract heterogeneous players who contribute new product, service and application layers, thereby creating new customer value. Furthermore, the creation and evolution of an ecosystem is largely determined by how the proceeds of doing business on the platform care divided between the platform owner and complementary assets providers, particularly in terms of the direct and indirect effects of the platforms.

Example 2: Apple

Experience suggests that the lion's share of a platform's success is earned when a single platform company is controlling the key platform components. The principles of how to share the proceeds of doing business on the platform then play a key part in the emergence and evolution of a viable ecosystem that attracts companies to join the platform and continue co-operation for a sustained period of time. Apple and application developers split the earnings 30–70, with Apple skimming 30 % of the price of applications and in-app purchases. This has given rise to many disputes, particularly with respect to in-app purchases. Application developers have also to tried to bypass Apple, albeit unsuccessfully.

Multisided markets

The concept of the multi-sided market differs from the conventional reseller model in that *direct* interactions between any of the various participants – suppliers, consumers, resellers, financial service providers, operators, etc. – in the market are possible. These interactions are facilitated by an open platform on which all participants are independent from each other (for more information see Hagiu, 2014). Supply chains between the participants are formed on a real-time, ad hoc basis for each transaction separately. In fact, on modern platforms, it is the paying customer, the consumer, who often chooses the supplier, the logistics provider and the sales outlet according to her own preferences (see, e.g., Amazon).

In a multi-sided market, the sale and delivery of a good, service or application from a supplier (e.g., primary producer or food manufacturer) to a final customer (e.g., a consumer) can con-

[7] For more information on complementary assets see and Teece (1986) and Gawer & Henderson (2007).

stitute a direct interaction (Hagiu, 2014). It is not necessarily controlled by an intermediary – such as a wholesaler or retailer – anymore; i.e., the seller takes on merchandising and transportation responsibilities and manages its prices on behalf of the intermediator. Furthermore, it is a direct delivery regarding the extent to which a certain actor retains residual control over the rights and ownership of customer relationship data on the goods, services and applications when traded. In contrast, in a reseller model, the reseller holds all residual control rights and ownership of the customer relationship data over the goods sold to final the customer. As an example, Alibaba and Amazon both started off as pure retailers but have transitioned closer to a multi-sided market model over time by enabling third-party suppliers and developers to engage directly with consumers on their websites. However, Alibaba and Amazon very closely control the selection and the quality of products, services and applications available for distribution.

A multi-sided market is characterized by three key attributes: 1) it serves two or more types of customers; 2) contacts between the various types of customers generate direct and indirect network effects; and 3) a third party is necessary to transmit these effects between the parties. It should be noted that, e.g., Facebook's platform includes eight different market sides. (Hagiu & Wright, 2015)

Typical parties to a multisided market include the following:

- Device and operating system manufacturers that often also serve as the platform provider (e.g., Apple).
- Third parties, such as application developers, that supply compatible applications and devices.
- Several user categories such as consumers, operators (Internet access) and advertisers.

Example 3: Apple

Apple retains responsibility for the development of devices and the operating system. As far as application development is concerned, Apple decided early on to use the Safari browser as the interface between consumer electronics companies and the foreseen third-party developers. The decision to select Safari was made because of the large number of existing applications and developers: Safari enabled contribution without having to learn something new. Apple's application store allows the sale and distribution of third-party applications. Initially, Apple's software platform was not available to all; later, however, the company opened it to all developers, which made it more attractive to application developers. In addition, operators played a major role in Apple's case. Initially, Apple signed an exclusive agreement on the sale of iPhones in the United States with AT&T. AT&T sold operator-locked handsets accompanied by a data package designed to 'teach' consumers how to use mobile data.

Boundary resources

In the literature on multi-sided markets and platforms, boundary resources have traditionally been understood as technical tools used to lower the threshold for third parties to join a company's platform ecosystem (Yoo, Henfridsson & Lyytinen, 2010; Ghazawneh & Henfridsson, 2013; Karhu, 2016). Boundary resources refer also to the social, legal, administrative and operational regulations and technical software tools and connections serving as interfaces between the platform company and third parties (Gawer, 2009; Ghazawneh, 2012).

These boundary resources are 1) social boundary resources such as agreements on rights, agreements on intellectual property rights, agreements on data usage and ownership as well as instructions and documentation (incl. user experience); and 2) technical boundary resources for multi-layered technological compatibility, software development kits (SDKs), application programming interfaces (APIs), application contracting interfaces (ACIs)[8] and even functional scripts.

These boundary resources are necessary to allow an extensive heterogeneous group to take part in the development, execution and maintenance of the various platform assets. Furthermore, the boundary resources and related measures can be used to both expand and restrict the potential for technology, product, service and application development. Moreover, the implementation of boundary resources has a positive impact on the company performance (Benzell, Lagarda & Van Alstyne, 2016).

The perspective of technical tools, however, has yet to be applied to social boundary resources on a similar scale. Smart contracts are a clear example of how social boundary resources are developing in an increasingly technical direction. It is becoming increasingly difficult to draw a distinction between technical and social boundary resources of platforms. Social boundary resources should therefore be perceived as technical enablers, similarly to technical boundary resources. (Lauslahti, Mattila & Seppälä, 2017).

Boundary resources are often provided free of charge or at low cost to lower the threshold for developers to contribute to the platform. On a parallel note, multi-sided markets and platforms indeed sometimes struggle with designing a sustainable revenue model, e.g., Uber. For instance, they often miss opportunities to apply multi-home strategies – i.e., providing platform access to competing platform providers and developers – that have the potential to create stronger leverage and diversity.

Example 4: Apple

Initially, as Apple did not offer technical interfaces to application developers, they set out to create their own interfaces, such as code skeletons, and by-passed the restrictions built in the hardware making it possible to install the applications through unofficial channels. Subsequently, Apple launched the iPhone SDK, which offered a development environment, interface builder, application performance analyzer and simulation tool for testing the applications. Moreover, Apple provided a number of APIs for basic services such as the address book, positioning data and URL utilities. In 2008, Apple launched an application distribution environment enabling users to look up, browse, purchase and download applications. However, as application developers continued to complain about Apple's reluctance to open the platform, the company upgraded the SDK extensively and added a large number of APIs (over 1,000) for navigation, in-app purchase support, etc.

Proprietary vs. shared operational governance

Finally, one of the most central dimensions of platform strategy captures how the *operational governanc*e of a platform is organized (for more information, see Tiwana, Konsynski & Bush, 2010; Tiwana, 2014). It answers the question of who builds, maintains and operates the platform. In accordance with seminal literature (Eisenmann, 2008), the answer is either a *single* firm or a *consortium* of firms that jointly operates the platform. In the former case, operation-

[8] For ACIs, see Lauslahti, Mattila & Seppälä (2017), and Lauslahti, Mattila, Hukkanen & Seppälä (forthcoming, 2018).

al control is *proprietary*; in the latter it is *shared* or – as we will refer to it in the remainder of the report – *distributed*.

Which of the two operational governance models dominates the other depends on a number of factors of which many relate to the specific industrial context the platform is to serve.

To start with factors that favor *proprietary* platform strategies, one of the fundamental drivers are large investments into expensive infrastructure required to establish a platform. Along the same lines, if building a large enough critical mass of platform participants requires expensive upfront subsidy strategies, a single firm strategy has clear advantages over *shared* approaches. A single firm is more effective in recouping these investments once the platform is running, as it does not have to share returns with a consortium, as is the case when control is shared.

The key challenge of *proprietary* platforms, however, is to find an effective way to attract participants onto the platform. The fears that participants may have about being held up and exposed to price hikes have to be countered with effective strategies such as user subsidies. The value of running a business on the platform must be made clear to all potential participants. Strategies for attracting a critical mass of participants will be discussed later in more detail.

A *distributed* governance[9] model defends its place when it is foreseeable that the intended market and its size can support only one platform in the long run. Joining forces in operating a single platform mitigates risks of losing very costly winner-takes-all competitions as platform providers race to establish the dominant platform.

The downside of the *distributed* governance model lies in its inherent free-rider problem: the costs of setting up the necessary infrastructure and attracting a critical mass of participants are difficult to allocate evenly among the consortium of platform providers. Some will pay more than others and suffer it in the form of lower returns on investment. Hence, the key challenge in setting up a shared platform governance model is in designing a return scheme that allows all providers to capture value in proportion to their original investments into setting up the platform. As will be discussed in later chapters, modern blockchain technologies have given promise of solving the issue very effectively.

3.2 Platforms transforming global supply chains

Based on the characterizations above, in this report we define an industrial multi-sided market and a platform as follows:

> A platform is a digital multi-sided marketplace and simultaneously an information technology system upon which different markets sides – i.e., the primary sector, food manufacturers, users, service providers and other actors (e.g., retailers) within and across organizational and industrial boundaries can conduct valued-adding and capturing activities directly on end markets in a business environment governed by an agreed-upon governance model, and industry specific boundary resources. Typically, these industry actors create, offer and maintain products and services that are complementary but also supplementary to one another. Industrial platforms quintessentially lure and lock in various types of industry actors with their network effects and other economic benefits.[10]

[9] For more information on distributed governance, see Mattila & Seppälä (2017).

[10] Adapted from Ailisto et al., 2016.

Box: Alibaba

In the 1990s, Chinese telecommunications were poor, and transaction costs of connecting Chinese sellers with domestic and international clients were high. The other significant market friction in China was a lack of trust and communication. In 1999, Jack Ma founded a B2B platform called Alibaba, the main objective of which was to reduce these market frictions. It had two websites, one to connect Chinese sellers to international buyers and one to connect only Chinese enterprises with each other.

To increase trust and communication between buyers and sellers, Alibaba allowed reviewing of company profiles and created messaging services through which users could communicate with each other by e-mail or chat. In 2001, Alibaba launched International TrustPass, which even further expanded the possibilities to give feedback and comments about other members. Alibaba also partnered with Chinese logistics firms but kept the process and quality control in-house.

To increase trust even more, in 2004, Alibaba launched a new escrow payment service called Alipay. Using the service, the consumer pays the price while placing her order, but Alibaba withholds the funds from the seller until the consumer reports she has successfully received the goods or until enough time has passed.

Contrary to numerous B2B platforms in the United States, Alibaba managed to attain a critical mass of users very successfully. Alibaba's strategy to attract sellers and buyers onto their platform relied on the total lack of fees, and it resulted in rapid growth: by the end of 1999, Alibaba had tens of thousands of members, and by December 2001, the amount of members had exceeded one million.

In 2003, Alibaba expanded into consumer markets by opening taobao.com. In the beginning, Alibaba was competing in B2C markets with eBay. Alibaba's pricing policy, which relied on fixed instead of auction-based prices, and the lack of transaction fees turned out to be favored by clients. Alibaba became a multi-sided platform and presently it has two B2B, two B2C and several B2B2C marketplaces.

Currently, Alibaba is the only enterprise that has integrated B2B and B2C platforms and thus cannot be directly compared to Amazon or eBay. In addition to growing remarkably swiftly, Alibaba has increased trust and communication in Chinese markets and enabled trading that connects thousands of merchants to millions of international clients. All this was rather impossible to imagine prior to the existence of platforms.

Market frictions:

- Lack of trust and communication
- Difficulties to contact clients beyond local market
- Lack of suitable marketing channels

According to Alibaba, the Chinese SMEs also faced:

- Limited geographic presence, which restricts their ability to develop customer and supplier relationships beyond their local markets.
- Fragmentation of suppliers and buyers, which makes it difficult to find and communicate with suitable trading partners
- Limited communication channels and information sources to market and promote their products and services to find new markets or suppliers
- Relatively small scale of operations, which limits their resources for sales and market
- Absence of efficient mechanisms for evaluating the trustworthiness of trading partners

David S. Evans, Richard Schmalensee: Matchmakers: The New Economics of Multisided Platforms s. 58–64.

Box: Amazon

Amazon was founded in 1994. It started as a traditional, single-sided online book store but later expanded into the platform economy and a wide variety of other products and services. Despite the beginning, the company's CEO Jeff Bezos never considered Amazon just as an online retailer. Instead, in his eyes, Amazon was a technology company, the main purpose of which was to create a more convenient online buying experience.

During the first years, Amazon was not making profits, since its strategy was to focus on growth. Amazon was not the first online book store, but a large selection of books combined with low prices and a user-friendly shopping experience soon distinguished Amazon from its rivals. In the late 1990s, Amazon widened its selection of goods into other products, and it has constantly been expanding to new areas ever since.

Since Amazon had millions of clients, it already had acquired a critical mass of consumers when transitioning into the platform business model in 2000. Amazon allowed people to sell used books on its website and therefore became a hybrid reseller platform. In addition to running a traditional business-to-consumer online retail store, it simultaneously had created a marketplace to connect buyers and sellers. In 2002, Amazon continued its platform expansion by launching a cloud-based computing platform called Amazon web services.

The expansion reached the grocery business in 2007, when online grocery service AmazonFresh was launched in Seattle and subsequently extended to a few other cities. In 2017, Amazon obtained a network of approximately 400 stores by acquiring the organic-grocery chain Whole Foods. Recently, Amazon announced it would lower the prices of Whole Foods, and since it has no necessity for making profits from its grocery store network, Amazon's actions may disrupt the already low-margin grocery industry. According to the newest news articles (TÄHÄN VIITE), the already materialized average price cuts at Whole Foods are on the order of 30 percent compared to prices before Amazon's takeover.

Recently, Amazon has also been extending into the payment and messaging industry. Consumers can deposit cash to their Amazon Pay account, earn rewards, loan money and pay with Amazon app in physical stores – the app can even charge the account automatically when consumers leave the store. Amazon is also developing a messaging application called Anytime, which includes features such as ordering food through group chat and splitting the bills with buddies. Amazon's financial and technological resources combined with a massive reach to consumers may have significant effect also on the payment industry, since numerous smartphones in US feature the Amazon app already.

Amazon's main contribution in removing market frictions is in streamlining the online purchasing experience and supply chain. In addition to simplifying the pure buying process, Amazon's platform also has globally connected sellers and buyers who otherwise would not have met.

Market frictions:

- Streamlining online purchasing
- Connecting and increasing trust between buyers and sellers

https://venturebeat.com/2017/07/31/amazon-could-make-whole-foods-a-place-to-play-with-alexa-gadgets/amp/
http://www.businessinsider.com/amazon-reportedly-working-secure-chat-app-anytime-2017-7?r=US&IR=T&IR=T
http://www.businessinsider.com/amazon-has-big-plans-to-disrupt-the-payments-industry-2017-7?IR=T&utm_source=Triggermail&utm_medium=email&utm_campaign=BII%20Weekender%20BII%20Marketing%207.29.2017&utm_term=BII%20Marketing%20-%20Engaged%2C%20Active%2C%20Passive%2C%20Disengaged
https://techcrunch.com/2016/06/22/amazonfresh-amazons-grocery-delivery-service-wakes-back-up-with-a-launch-in-boston/
http://www.telegraph.co.uk/technology/amazon/11801515/Amazon-timeline-from-internet-bookshop-to-the-worlds-biggest-online-retailer.html

Box Ocado

Ocado is a British online grocery retailer founded in 2000. In addition to having the largest online supermarket in the world, it has a platform for grocery retailers that are willing to initiate online business. Like Amazon, Ocado has been focusing on creating a convenient customer experience, including selection and home delivery services.

Due to regulations, logistical challenges and other characteristics, the field of online groceries is challenging to operate in. The UK market has been dominated by the four largest companies, and it is characterized by fierce price competition, low mark-ups and high volumes. Ocado has navigated these challenges successfully by utilizing efficient logistics, automated fulfillment centers and a user-friendly ordering interface.

OSP, Ocado's digital cloud-based proprietary platform for UK market retailers that are willing to operate online, was launched in 2014. OSP provides Ocado's handling equipment and software solutions as well as an e-commerce website and mobile application customized for retailers' needs. Morrisons, one of the four largest grocery chains in UK, is the only retailer in OSP so far.

OSP differs from platforms such as Amazon and Alibaba in that it is a technology provider for retailers rather than matchmaker between buyers and sellers. Therefore, Ocado's main contributions in removing market frictions are in creating a convenient grocery shopping experience and providing technological solutions for new online retailers.

Market frictions
- Serving groceries to customers' homes efficiently and conveniently
- Providing technological solutions to set up an online grocery store

https://hbr.org/sponsored/2017/05/how-an-online-grocery-platform-could-reshape-retail-as-we-know-it
Vuosikertomus 2016: www.ocadogroup.com/~/media/Files/O/Ocado-Group/reports-and-presentations/2017/ocado-annual-report-2016.pdf

4 Emergence of distributed platform strategies – A look toward the future

In the above chapters, we introduced the key concepts that define the platform model as it is understood currently in the literature and practice. It is important to note that the model as discussed so far has been *centrally* governed. Whether proprietary or shared, the governance model has assumed that running the platform necessitates an entity – a single firm or consortium of organizations – which controls the platform's technical infrastructure and maintains operations.

However, what if competitive dynamics call for a completely distributed, self-governed platform that is not directed or maintained by a central entity? What if the governance model needs to be fully democratic and completely impartial to any power relationships? In such a case, the platform has to be built on technology that enables self-governance. Before moving on to building the roadmap toward a food chain platform, this chapter very briefly introduces key technologies and applications thereof that will enable the design of fully distributed platforms in the future.

4.1 Blockchains, Smart Contracts and Initial Coin Offerings aim to disrupt the contemporary platform

Over recent years, 'blockchain' has become a popular buzzword, but the definition of the term is, in fact, not entirely clear. To capitalize on the hype, many things label themselves blockchains when in fact they are not on the other, and not all things that could be called blockchains label themselves this way. Generally, however, a blockchain is a cryptographically chained data structure that enables distributed control over shared databases. Furthermore, over the past years, as companies have started working on more specific applications around this database-sharing technology, the common use of the word 'blockchain' has also been extended to these companies as well their products. (Mattila & Seppälä, 2015; Mattila, 2016)

While the terminology around the blockchain phenomenon is ambiguous at best, the core concept behind the technology itself is, in fact, quite simple. When a database needs to be modified by multiple parties at the same time in an overlapping manner, either their modifications have to be somehow consolidated together, or multiple differently modified versions of the same database will emerge. The traditional approach has been to introduce a central authority that governs the database.

Blockchain technology, however, enables a more effective way to solve the concurrency problem in a completely distributed manner. Instead of having a central authority that maintains a database and guards its authenticity, a copy of the entire database is distributed to an open cloud for every willing participant to independently maintain. The copyholders then follow a predetermined set of database management rules and validate each other's versions individually.

In other words, instead of a central authority keeping everything in sync and dictating the modification history of the database, with blockchain technology, every participant gets a say in what they think the true course of events has been. It is a new way of organizing and managing databases in a leaderless democracy of devices, incentivized to work together for one shared consensus view.

The idea behind smart contracts is that by writing contractual arrangements into algorithmic format and by deploying them into a distributed blockchain database, contractual arrangements can be made self-enforcing and tamper-resistant, without the need for any kind of a central authority. By reducing the need for routine human intervention, the entire contractual process can thus be made less risky and more cost-efficient. (Lauslahti, Mattila & Seppälä, 2017)

The possible use cases of smart contracts are virtually endless, extending from e-commerce to autonomous machine-to-machine transactions and from pre-contracted budgets to automated access control[11]. One example would be an automated lease contract on a vehicle that would revoke the user access to the asset if the proper payments have not been made accordingly. A fully established definition for smart contracts has yet to be formed, however, and the official legal status of smart contracts is not completely clear (Lauslahti, Mattila & Seppälä, 2017).

The introduction of smart contracts has enabled an entirely new mechanism for developers to profit from taking part in open source development. By algorithmically embedding tokens

[11] For use case, see Hukkinen, Mattila, Ilomäki & Seppälä (2017).

Box: Examples*

Traceability

As logistical supplier networks are growing more complex and as products are becoming increasingly customized, the product traceability of individual items is becoming increasingly important, even an outright necessity.

However, storing individual product data over their entire life cycle has proven problematic. Sooner or later, the product descriptions often become decoupled from the physical items in the information systems of the parties involved. This can lead to negative impacts on operational efficiency, e.g., disrupted deliveries, increased waste production, and unnecessary data processing.

As a response to these issues, the use of blockchain technology has been proposed as a solution to the information sharing problems. With the use of a single-version distributed database, the participants coming across a certain product individual can contribute to maintaining the related product data on an equilateral basis, thus preventing the decoupling of the product data from the product item.

Supply chain dynamics

As companies focus less on process-level optimization of products and more on the optimal behavior of individual products items in the supply chain, more dynamic solutions to supply chain management are necessary. Blockchain technology can provide the customer with more opportunities for service customization, and increased real-time control over dynamic re-routing decisions.

As an example, a customer looking to purchase a strawberry cream cake could scan the shared product database for suitable options by using various border parameters: the maximum amount of sugar per 100 grams, the earliest picking date and the maximum delivery distance of the strawberries, the minimum acceptable price paid to the producer of the strawberries in the supply chain, and so on.

Planning ahead of time, the customer could purchase the raw materials and the bakery service individually, and specify the time and the destination of the delivery at a later point.

Shared platforms

Launching a new platform involves large-scale investments in new infrastructure and user acquisition. When multiple parties want to deploy a platform ecosystem together, it is easy to run into free-riding problems: If one party invests in the platform, the other parties can also tap into those investments and reap the benefits without any cost or risk exposure.

Blockchain technology enables the use of a new mechanism for monetizing contributions to open source ecosystems. Through token sales, the developer of a platform can write an open source protocol containing an incentive structure for deploying the platform ecosystem.

By adhering to the protocol, anyone can invest capital and resources toward the development of the ecosystem without falling prey to free-riding problems. By allowing all parties to become investors in the shared platform ecosystem, blockchain technology enables the participants to align their incentives and to actively make contributions toward the common effort, without having to worry about how to collect fair profits on their investments.

* For use case development, see Mattila et al. (2016).

of value and financial revenue schemes directly into the underlying protocol of the platform, open source communities can incentivize a wide range of contributions, *such as* user acquisition, source code development, or the provision of hardware capacity for the deployment of the platform.

By employing a blockchain-enabled smart contract written into the form of an investment contract, one can algorithmically produce a set of tokens that behave much the same way as securities.

5 Methodological approach to platform concept building

The study takes a multi-methodological approach to designing the intended open platform concept. In a first step, the status quo of platform conceptualization in the international literature was reviewed and complemented by fresh insights generated in on-going platform research in Etla's research network. The results served as a fundamental theoretical basis for the sub-sequent steps, establishing the necessary taxonomy that defined a common starting-point for and enabled efficient communication among the various stakeholders of the project. Chapters 3 and 4 of the report have laid out the results of this phase.

In a second step, the taxonomy was presented to the stakeholders of the project – 15 firms and industrial organizations representing each link in the food chain – in a full-day, co-creative workshop. The participants were given lectures on the platform concept as a business model and way of organizing markets, including existing real-world examples from other sectors of the economy. Interspersed in between the lectures, participants engaged in creative tasks charged with applying the platform concept to the food chain as it exists today. The purpose of the exercise was to map the level of readiness of the industry participants to transition to a platform-based model of industrial organization and to identify possible bottlenecks that might impede the transition. After each of the tasks, the results were presented openly and recorded by the research team for further analysis and platform concept development.

Leaning on the results of the workshop, the research team drafted a web survey targeted at the entire stakeholder base of the project. The survey sounded out the respondents' opinions on how they thought a feasible implementation of a platform model in the food chain might look like. The respondents were allowed to choose from a number of options for each dimension of the platform model – platform governance, operations management, technology infrastructure and data sharing. The options ranged from suggesting only incremental changes to the currently prevalent practices in the food chain to proposing radical pivots that would entail changes to the roles and business models of participating firms. Chapter 6 provides a comprehensive exposition of the survey results. The submitted responses allowed for creating a number of alternative scenarios – ranging from conservative to ambitions – that could serve as the basis for designing a strategic roadmap toward an open, digital food platform.

Subsequently, the scenarios were presented in a second workshop. Again, the participants were asked to provide feedback with regard to the proposed scenarios. Special attention was paid to identifying those initiatives that the participants would be comfortable with and ready to implement in the very near future and those that would require considerable development work before being addressed. The feedback, in turn, was used to design the final roadmap.

The design effort was supported by feedback gathered from eight in-depth interviews with a selection of the stakeholders of the project. The interviews comprised a short recapitulation of the platform concept and a semi-structured interview during which the interviewees had enough freedom of movement to steer the conversation into platform-related topics and issues that were relevant from the respective organizations' perspective.

The roadmap is presented in Chapter 7.

6 Mapping the industry's readiness to transition toward a platform market model

To study the realistically possible dimensions of the platform, the industry participants were asked to respond to a survey. In essence, the survey mapped two factors that constitute preconditions for the built-up of a platform ecosystem: 1) readiness and possibilities to share data, and 2) views on the level of centralization of the platform in its governance, operations, and technical implementation.

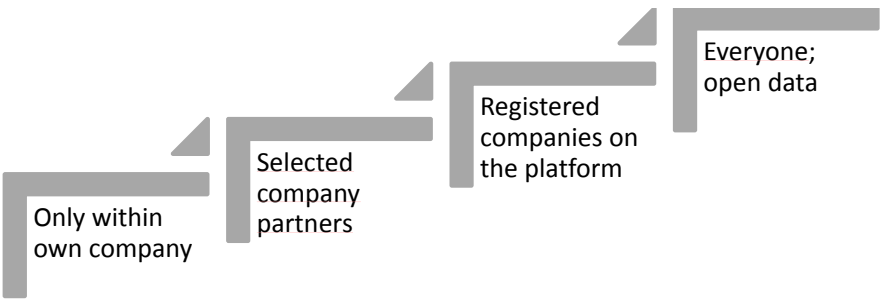
The following sections describe the main outcomes of the mapping. Complete mapping results concerning the views on the level of centralization are presented in Table 6.1.

6.1 We want to share our data! (Unless it concerns our products)

The respondents (N=17, including 13 individual companies/organizations) were asked to assess with which platform participants they would be willing to share different datasets on a 4-level scale (Figure 6.1). In step 0, companies are in fact not willing to share data, as they intend to keep it within the company. In step 1, data are shared with selected company partners. In step 2, data are shared with other companies operating on the platform, and in step 3, data are openly shared with all interested parties. The respondents were able to indicate whether the specific question was not applicable to their operations.

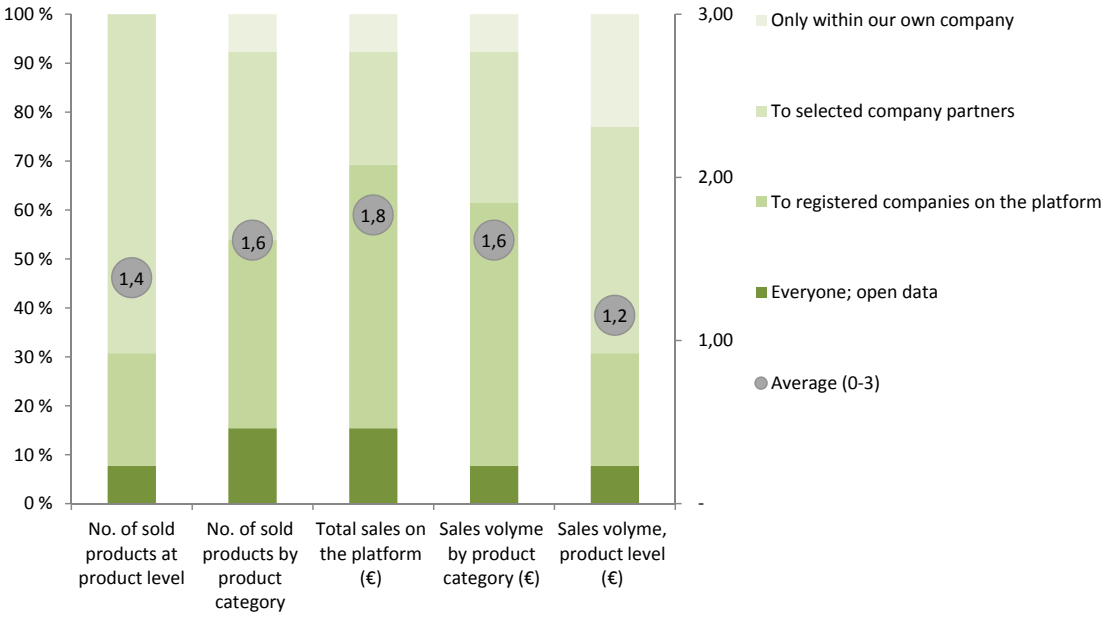
In the questionnaire, the respondents estimated their willingness to share three different types of data: product data, logistics data, and customer data. On average, the respondents were more eager to share aggregate than detailed product level data. In fact, approximately 70 % of

Figure 6.1 Description of the Likert scale steps used in the survey



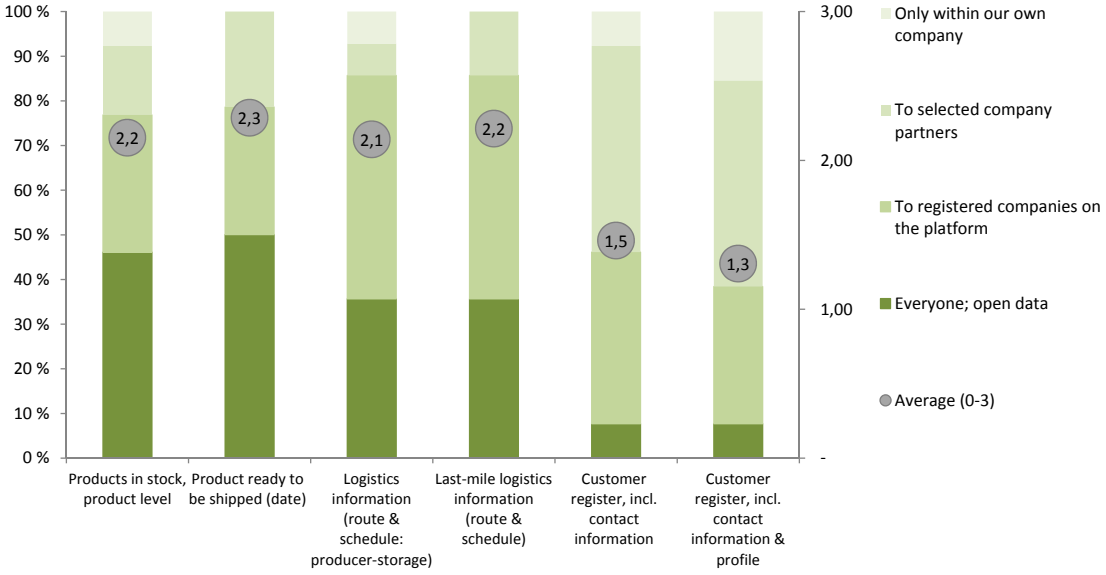
the respondents were not ready to share their company's product level sales volumes with other companies operating on the platform. Consequently, there was a higher readiness to share more aggregate, product category level data. For example, 70% of the respondents were ready to share their company's total sales generated on the platform. (Figure 6.2)

Figure 6.2 Project participants' willingness to share product and sales data



Source: ETLA. n=17.

Figure 6.3 Project participants' willingness to share logistics and customer data



Source: ETLA. n=17.

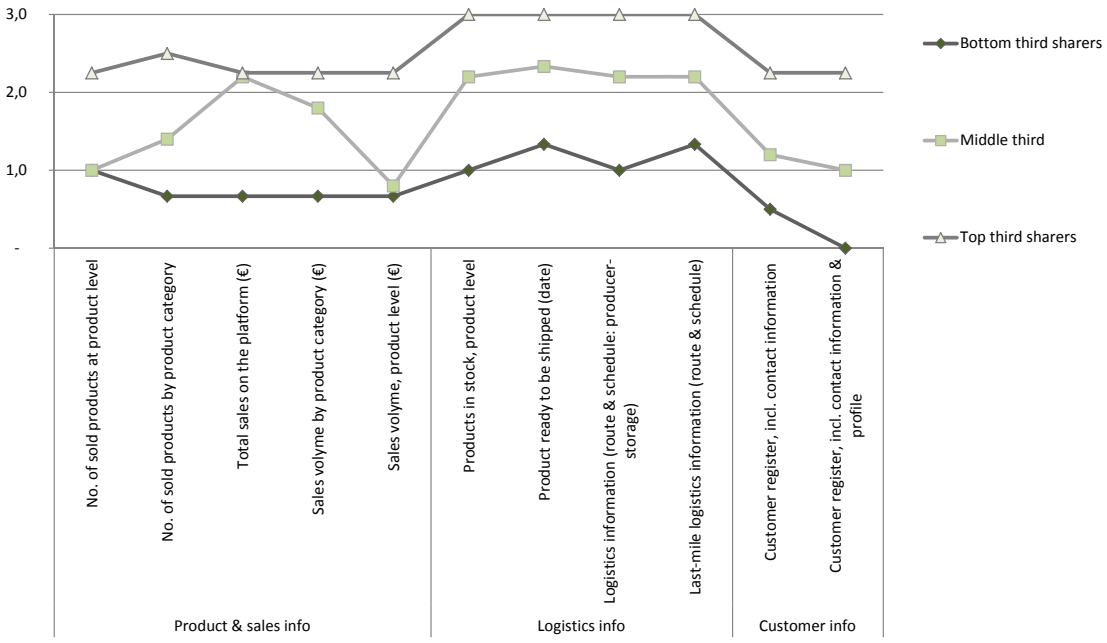
In workshop discussions, the participants argued that there is a clear difference in the willingness to share data that has been generated on the platform, and data that the companies already possess.

Compared to other groups of data, the companies considered logistics data, including information on their stock, shipping schedule, logistics routes and schedules, and last-mile logistics data, as something that could be rather easily shared, if compared to other groups of data. (Figure 6.3) In the workshop discussions, logistics was highlighted as one of the Achilles heels of current retail operations; they are considered costly and sub-optimal. According to the research of Ali-Yrkkö (2013), logistics constitutes approximately 3% of the selling price of foodstuffs in Finland.

Although logistics is not in the "core" of the companies involved in this mapping, it plays a crucial role in the value chain of foodstuffs, particularly when considering goods that have a limited shelf life and require refrigerated transportation. Respectively, all improvements in the logistics chain are warmly welcomed by the industry; this, in turn, is mirrored in the willingness to share data in order to create new and improved logistics solutions, channels, and networks. However, it was said that the willingness to share could also correlate negatively with the quality of data: logistics data can be partly very scarce, can be of poor quality, or can be available only for the past.

The willingness and ability of the respondent organizations to share data divides the respondents into three groups. While the most willing firms are ready to share all their logistics information with everyone, the bottom third are much more careful: in practice, these respon-

Figure 6.4 Summary of the project participants' willingness to share data



Source: ETLA. n=17.

dents are ready to share their logistics data only to selected company partners. In parallel, the middle third is most open to the sharing of logistics and total product sales volume data, while protecting customer information most vehemently. (Figure 6.4) The respondents' attitudes toward sharing data reveal the pitfalls and low hanging fruits for platform development. It is advisable to start off the effort where the willingness to share data is highest. Logistics seems to be the lowest-hanging fruit and a logical point of departure, as it has been identified to be the most critical bottleneck in gaining direct market access.

6.2 The industry is ready for decentralized platform governance, operational implementation, and technology

The existing and most successful platforms – as we have learned to know them – are proprietary and centrally controlled. While they typically welcome all criteria-compliant producers and customers onto the platform, the platform itself is controlled by a single, profit maximizing company. While this proprietary model has resulted in tremendous success stories, it has also created monopole-like market structures that attest to the tremendous bargaining power of single operators who have the ability to tear apart entire retail sectors. Therefore, one of the aims of the survey was to gather the industry's feedback on the various alternatives for the platform's development model: given the potential drawbacks of the proprietary – if effective and proven – platform model, would the industry rather favor a more distributed approach ("decentralized platform"), and if so, what would a distributed control model mean in practice?

The respondents were asked to evaluate different aspects of *platform governance*, *operational implementation*, and *technical execution*. Each of the three sub-categories featured several detailed descriptions of different implementation scenarios, and the respondents chose between two possible options: one option represented a more *centralized* and the other a more *decentralized* model. The final aim was to form a blueprint of the participants' general mindset with regards to the platform's control model.

In general, it seems that the majority of the respondents are interested in a *decentralized* control model in all three platform dimensions: governance, operational implementation, and technical implementation. In particular, the matching of customer needs and supplier offering should be allowed to be a self-directing process of trial and error, rather than a strategical process guided by a single platform owner. Similarly, the vast majority of respondents observed that the target markets should not be determined explicitly by a single operator but rather should emerge freely as participants join and leave the platform. (Figure 6.5)

The only clear exception where the majority of the respondents hoped for centralization is the set of values that govern the platform's general operations: most of the respondents see that the platform should have a set of pre-determined values, instead of an organically evolving, emergent set of values. Typically, the values of a platform would in such case be part of the platform's governing algorithm. (Table 7.1)

The respondents also took a stance on the level of the decentralization of the technical implementation of the platform. Here, the interviews conducted before the implementation of

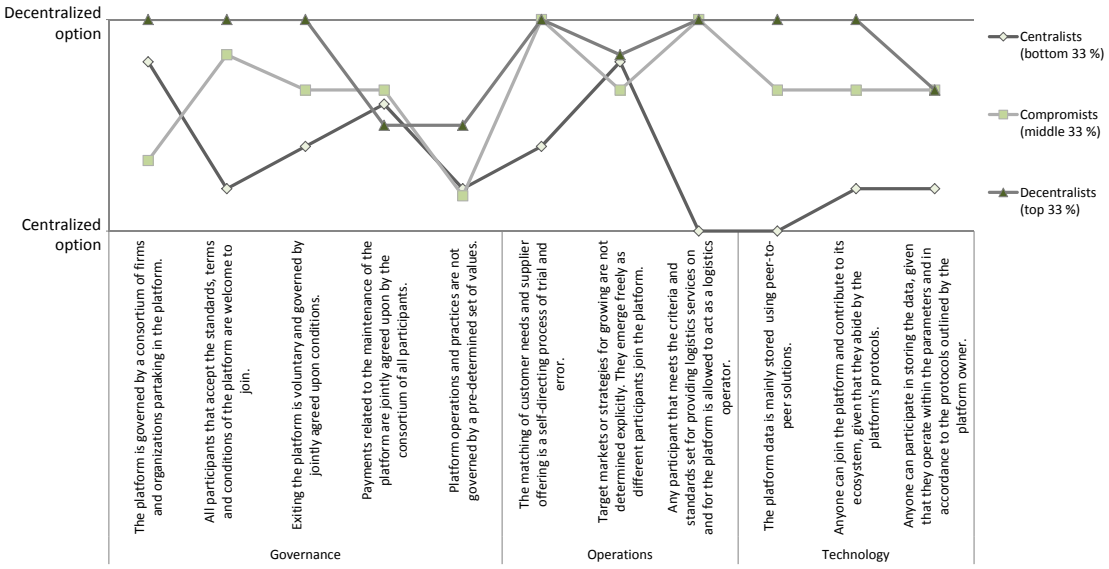
the survey provided valuable support for the interpretation of the results: several respondents stated that technical solutions, such as blockchain technology, are beyond their interest and understanding. Hence, the results concerning technical implementation should mainly be considered more intuitive reactions than informed opinions.

The interviews also shed light on the motivations behind the readiness for a decentralized platform model. The current market structures in both industry and retail are highly concentrated. Many companies in the processing industry have only a single large (domestic) competitor, while the retail sector is practically a duopoly. As a result, the current strategic freedom of movement for the industry is minimal. A decentralized platform would add another sales channel that would also enable direct outreach to customers. In addition, the industry would be awarded more direct control over the pricing and category management of their products, a domain currently governed by the retail sector. Due to the cumbersome market situation, efforts like this are also easier to take on together: the risk of "punishment" from the concentrated customer's side decreases as the number of "rebellious" platform participants rise (VNK, 2017).

The ideal of a common effort with common gains calls for openness and decentralization

However, in the interviews, some realists noted that a centralized platform model would not harm the operators of the food industry either: it would in fact represent a very familiar and, therefore, easily implementable course of action in light of the power balances of industry and retail today. In addition, some industry representatives were concerned about the agility of decentralized decision making of the platform: a large and diversified pool of democratic decision makers might not be able to make decisions on the necessary reforms fast enough, if at

Figure 6.5 Summary of the mapping results on the governance, operational implementation, and technical implementation



Source: ETLA. n=17.

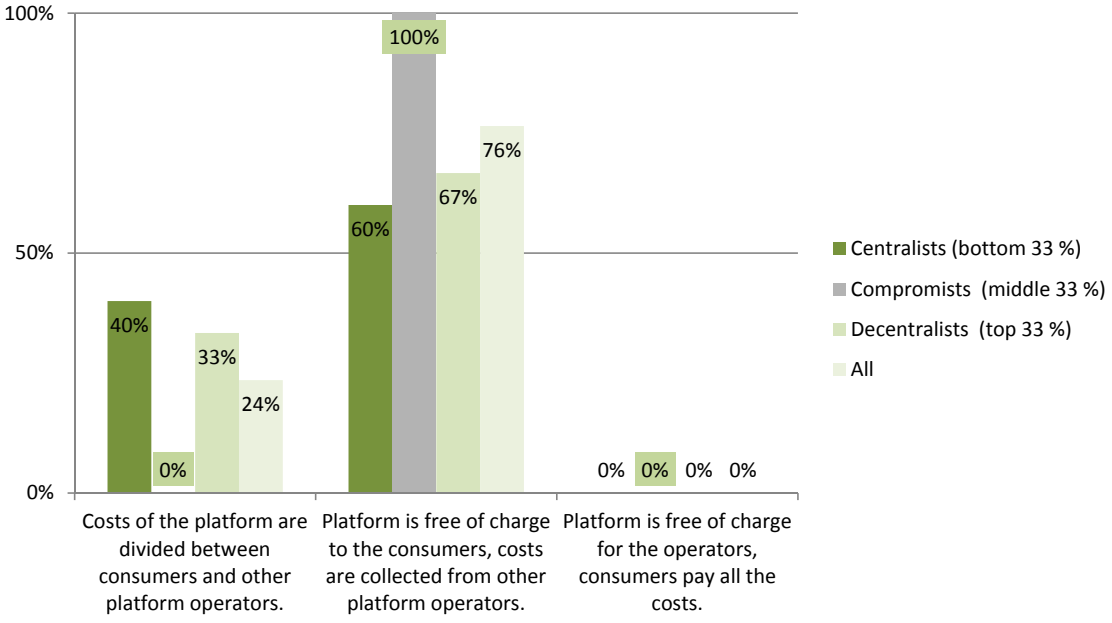
all. This, in turn, could paralyze the development of the platform. The concern welled from the experiences with the GS1 platform, a product information organization owned by the interest groups of retail, food industry, and the Finnish Central Chamber of Commerce. Several of the food industry companies considered the operating model of GS1 stiff and partial to the interests of the retail sector.

6.3 No entry barriers for consumers

Along with other dimensions of operationalization, the respondents were asked how they would construct the pricing mechanism on the platform. In the survey, more than ¾ of the respondents said the platform should be free of charge for the consumers and that the costs needed for the maintenance should be collected from other platform participants. The remaining quarter stated that the costs should be divided between consumers and other platform participants. None of the respondents wanted to push the costs solely onto consumers. (Figure 6.6) This aversion to visible consumer born costs is a clear signal of the importance of individual consumers on the platform – the industry is not willing to compromise the entry of consumers onto the platform by creating any monetary entry barriers. In fact, the amount of individual consumers on the platform is typically a crucial element in creating the network effects that are necessary in creating a functioning platform.

According to the survey and the related interviews, there is a genuine need and willingness among the actors of the food processing industry to create a new modus operandi. The current domestic market situation coupled with the pace of change taking place in US e-com-

Figure 6.6 How should platform maintenance costs be divided between consumers and other platform operators?



Source: ETLAs mapping for project participants. n=17.

Table 7.1 Governance, operations and technical implementation. How centralized should the platform be? Respondents were able to choose between two options (centralized or decentralized). n=17.

Centralized	*Decentralized*
GOVERNANCE MODEL	
The platform is governed by a non-profit foundation, governmental entity or a private firm. 25 % of respondents	**The platform is governed by a consortium of firms and organizations partaking in the platform.** **75 % of respondents**
In addition to complying with the platform's set standards, terms and conditions, participants need to pass the evaluation of the platform owner and administrator. 29 %	**All participants that accept the standards, terms and conditions of the platform are welcome to join.** **71 %**
The platform's owner and administrator sets up the terms and conditions for exiting and removing participants from the platform. 29 %	**Exiting the platform is entirely voluntary and governed by jointly agreed upon conditions.** **71 %**
The platform owner and administrator sets the prices for operating on the platform. The owner can leverage different pricing strategies to offset the economic risks it bears alone. 33 %	**Any payments related to the maintenance of the platform are jointly agreed upon by the consortium of all participants. Economic risks related to operating the platform are born by the consortium.** **67 %**
The platform is governed by a specific set of values that is further reflected in the norms as well as the terms and conditions determined by the platform owner and administrator. **71 %**	Platform operations and practices are not governed by a specific, pre-determined set of values. Instead, practices emerge organically as participants with their respective sets of values interact on the platform. 29 %
OPERATIONS MODEL	
The platform owner and administrator consult consumers, analyzes data and strives to match customer needs by compiling the right assortment of products and services. 18 %	**Platform participation is completely free. The matching of customer needs and supplier offering is a self-directing process of trial and error. Participants that fail to address customer needs exit the platform.** **82 %**

The platform owner and administrator determine target markets, designs the respective growth strategies, and decides on the actions for attracting a critical mass of participants. 24 %	**Target markets are not determined explicitly. They emerge freely as different participants join the platform. Similarly, strategies for growing a critical mass are not deliberately designed but form with the successes and failures of participants on the platform.** **77 %**
The platform owner selects the logistics operators allowed to serve the platform. The owner itself can act as a logistics operator as well. 29 %	**Any participant that meets the criteria and standards set for providing logistics services on and for the platform is allowed to act as a logistics operator.** **71 %**

TECHNICAL IMPLEMENTATION	
The platform owner governs access to the platform's databases. Information is mainly shared by using a conventional server hierarchy. **41 %**	**The platform data are mainly stored using peer-to-peer solutions. This way, anyone has access to the encrypted data. Without a suitable private key, however, the data cannot be meaningfully deciphered.** **59 %**
The central server governed by the platform owner has the authority to decide who can make modifications to the databases of the platform. The platform ecosystem can be joined only with permission of the platform owner. 35 %	**Anyone can join the platform and contribute to its ecosystem, given that they abide by the platform's protocols. Modifying the platform's databases is thus not based on authorization by a central server but the distributed management of access rights in accordance to the shared protocol.** **65 %**
Data are stored either on servers governed by the platform owner or in encrypted format in a cloud service governed by the platform owner. The owner of the platform is responsible for maintaining data integrity with backups. **44 %**	**Anyone can participate in storing the data, given that they operate within the parameters and in accordance to the protocols outlined by the platform owner. The origin and the authenticity of data can be validated by using blockchain technology.** **56 %**

DIVISION OF MAINTENANCE COSTS		
Costs of the platform maintenance are divided between consumers and other platform operators. 24 %	**Platform is free of charge to the consumers; costs are collected from other platform operators.** **76 %**	Platform is free of charge for the operators, consumers pay all the costs. 0 %

merce inspire operators to come together in a search for new solutions. The companies are ready and willing to start sharing their data, especially if the data is generated by a platform solution. From already existing data, logistics information stands out as a unit of data that could be shared in the first phases of piloting new cooperation models; perhaps not with the whole world but at least with the registered operators of the platform. The industry's willingness to share its data is not only delightful but also relieving: If the platform participants were not ready to share their data, we would in fact be talking about a shared interface for several separate online shops, not a platform in its true sense.

In terms of platform control and practical implementation, most of the food industry participants are interested in shared control across all essential platform dimensions. The aim seems to be a platform that freely evolves, grows, or disappears together with the fates of its participants; be that companies from the food industry, consumers, logistics operators, or other yet

Box: Information management initiatives in the past in the Finnish food sector

The first initiative for collaboration and standardization in the food industry in Finland was the introduction of EAN (European Article Number) barcodes to packaging in the 1980s. In the first phase, both the food and the retail sectors agreed to invest in the new standard: the food industry in the package reform and retail in barcode scanners. As a condition for the investments, the food industry demanded that the retail sector provide them the cash register information collected from the sales of their products. Although having evolved and expanded from its early days, the coding system has survived to date and is currently controlled by GS1, a global not-for-profit organization. The EAN codes are utilized to specify the manufacturer and the type of the product in the food value chain. In addition, the codes are linked to a database, providing more detailed information about the products under hundreds of attributes. The information in the database is provided by the food industry, but they do not currently have the access to information supplied by other companies.

Another initiative combining market information from the food industry was the Scantrack service provided by AC Nielsen, a commercial data and research company. The service was based on barcode data delivered by retail stores to AC Nielsen for analysis. In 2006, the Finnish Competition and Consumer Authority became concerned about the level of detail of the distributed information and its potentially negative effects on competitive dynamics and anti-trust issues in the food chain. A remarkable factor in the concerns was the degree of centralization in the Finnish food retail sector. Fearing possible damages, one of the large retailers, S Group, withdrew by its own initiative from delivering data to the Scantrack service, finally resulting in the total termination of the service in Finland in 2008. In Sweden, Scantrack is still running, without major conflicts with the local competition authority. In Finland, Nielsen is providing an alternative Homescan service in which consumers themselves scan their purchases. However, the data from the Homescan service is not as reliable as the Scantrack data, as the sample is much more limited and as consumers may not always scan all of their products.

The third effort to incorporate industry data is SELMA (Suomen elintarvikemarkkinat, The Finnish Grocery Market). SELMA was initiated by the Finnish Food and Drink Industries' Federation in 2003 and is operated by Analyse2, a Finnish retail planning company. The service includes all the same information the suppliers are providing for the retail stores. The service is currently actively used in the meat industry, but adoption in other industries has not been as extensive. The Finnish competition law limits SELMA services to some extent, as information about certain product categories can be published only if it includes the information from at least three different companies. To fulfill this requirement, the data are sanitized accordingly by Analyse2.

unknown dark horses. Although the majority of the companies root for shared control, democratic decision making, and openness, the "values of the Internet" do not seem to please the company representatives: less than 30 % of the respondents are willing to crowdsource the platform's value setting. In a time of intentional disinformation and hate speech flourishing on the Internet, this deviation from the path of decentralization is easy to understand.

7 Implications of Industrial Platforms for Company Strategy

7.1 Managerial Implications – Fulfilling the minimum requirements for adopting a digital platform strategy

The observed willingness to transition to an open and shared model of industrial organization is a crucial prerequisite for any effort toward building a successful market platform. The survey results revisited in the previous chapter provide promising signals emanating from the Finnish food chain. The willingness indeed exists.

The first step in designing a roadmap toward such a market platform, then, is to take account of the current capabilities that companies have to start off on the road. It is necessary to anchor the roadmap in a well-defined starting point. It turns out that companies still have a very limited set of tools to take with them on the road.

According to the latest study by the Research Institute of the Finnish economy, on average, only 12.3% of the primary and food sector companies consider that the current forms of digitalization have a strategic importance for their firm. On average, only 4.1% of the companies consider that big data has a strategic relevance as a tool for their businesses. Furthermore, only 9.3% of their full product portfolio is being digitized. Nevertheless, the greatest problem of the primary and food sectors is that the companies do not have in-house human resources that could understand the relevance of the current developments in digitalization and turn them into actionable company strategy. Only 3.4% of the companies report to have invested in the necessary skills and human resources through the respective recruitment initiatives. (Rickne, Giertz, Seppälä, and Pajarinen, 2015). It goes without saying that investing in the necessary skillsets should be the very first strategic move by any company that intends to take a platform strategy seriously in the long run.

Based on the above, as managerial implications, we postulate three minimum requirements that all companies must fulfill before considering the adoption of a digital platform strategy. Only after the fulfillment of these requirements does it make sense to consider following a strategic roadmap toward digital platform markets:

Managerial Implication No. 1:

All products and services considered to be offered on a digital platform must have a digital twin, a virtual object that can be scrutinized in an online environment. All relevant information regarding content, its properties and use must be available in digital form. This includes visual representations – but also audio if deemed necessary – to make an informed buying decision. A digital twin should be considered as a life-like digital representation of the product or service.

As an example of a cutting-edge solution, some clothing companies provide their customers with the possibility to fit 3D-modeled clothes online on the digitally pre-scanned bodies of their clients for a realistic virtual fitting experience.

Managerial Implication No. 2:

Companies that intend to operate on a digital platform must establish a digital showroom – a company-owned e-commerce store – for all their products and services intended to be distributed through the platform. Such a showroom is necessary in order to be able to 1) share information with the consumer about products and services; 2) market and sell the company's complete product portfolio to the markets; 3) test prices and pricing strategies for the company's complete product portfolio, and finally 4) introduce new product innovations immediately when available to the markets.

Some platforms have one unified store front (App Store, Amazon, etc.) instead of directing buyers into each participant's own e-commerce store. However, a unified store front with integrated logistics, marketing and payment interfaces is a goal much further down the roadmap, as we will show shortly. One major reason for this is that the requirements for a unified store front are still incompatible with the unwillingness of companies to share the required customer data.

The above measures give companies the minimum capability to act in a digital environment. To recapitulate the industry's motivations to do so, here is a summary of the three most essential ones as identified in the company interviews:

1. Consumer preferences are ever more fragmented and individual in the future. Small batch specialty products are gaining in popularity. These megatrends have already transformed the business model of the music (Spotify, SoundCloud, Pandora) and clothing (Zalando, Boozt.com, various social media based second hand platforms such as eBay) industries. The current, high volume-dependent value chain structure of the food chain cannot cope with these fast changing, unscalable market requirements and deters companies from tapping into the potential of changing consumer preferences.

2. There are physical and economic limitations to available space when marketing and selling primary sector and food manufacturers products. In a digital channel, the need for physical space is entirely independent of the scope of the offered product range. In a digital channel, companies do not need to compromise on the breadth of their range because the typical space limitations and economies of scale do not constrain them.

3. Current innovation and commercialization processes in the food value chain are riddled with delays, high costs and market risks because innovative companies do not have direct market access to test out product concepts and pricing strategies. They are dependent of downstream market channel partners and their respective market strategies. The vital direct feedback link between the consumer and the innovator is non-existent. Therefore, innovations tend to be incremental, often limited to changes in packaging and its design. For bolder innovations, the innovator needs to better read and understand its consumer base so it is able to assess the technology and market risks associated with an intended innovation.

Locked into the rigid structures of the current value (and power) chain, breaking with conventional business model strategies is difficult. The key question in building out a viable roadmap, then, is who will initiate the design and construction of the platform, a show room for the digitization of product and service management?

- Will all primary sector and food manufacturing companies each build one of their own?
- Will all primary sector and food manufacturing companies join existing show room platforms such as Amazon or similar ones?
- Will the primary and food manufacturing sectors establish a joint show room?
- Will the current e-commerce stores of retailers feature a show room for the primary sector and food manufacturers and allow the development of digital product and service management solutions by providing the necessary tools for the implementation?

Possible avenues are many. In the next section, we will face the challenge and develop the 6-stage strategic roadmap that builds on the current readiness and willingness of companies for a grounded and realistic approach.

7.2 Roadmap to an industrial platform – The short term

The development of operational efficiencies and productivity of the single company are not enough in the future for achieving competitive advantage. E-commerce giants such as Amazon, together with Whole Foods, Alibaba, etc., are challenging the role of entire industrial sectors by combining the digital to physical – by integrating e-commerce and logistics operations to transportation[12].

Amazon-like and Alibaba-like companies are no longer only e-commerce companies; they are combining their global e-commerce and logistics management scale to transportation scale. With these new strategies and their scale, e-commerce giants can quite easily challenge and take over entire industries – both regional and national – and their respective value chains by removing middlemen and eating the market share of incumbent retail companies. A powerful current example is Amazon's takeover of Whole Foods, an organic, up-market US food retailer. Supported by Amazon's cutting-edge logistics management, the company cut consumer prices across several of their key product categories by over 30%. This would destroy the business model of retailers operating in a conventional value chain.

Based on these emerging global competitive threats, we have formulated the following short-term roadmap for Finnish food industry actors ranging from the primary sector to food manufacturing and food retail.

Stage 1: Transportations Platform – Creation of an *available to pick & deliver* and *available to return & deliver* platform

The transportation of goods is not typically considered as a competitive advantage of any primary sector, food manufacture, or retail company. Perhaps it is because of this reason that our evidence attests to a relatively high willingness of companies to openly share their business

[12] "Changing the Ocean Shipping Game, Amazon, Alibaba, Maersk, and CMA CGM Leading the Way" http://www.supplychain247.com/article/changing_the_ocean_shipping_game_amazon_alibaba_maersk_and_cma_cgm (information retrieved August 28, 2017).

data related to their transportations operations. This serves a good starting point for the creation of an industry platform. The idea is to start off by building a platform that serves a single function, here logistics. If companies do not see impediments to sharing the necessary data, it is indeed a viable choice. It follows the principle of least resistance. In subsequent stages, then, the platform can be extended to serve additional functions.

Box: Hybrid and merge-in-transit logistics

Until now, logistics optimization literature has not been focusing on optimization of either last mile or long haul logistics, but without merchants sharing data with each other. According to Arnäs, Holmström and Kalantari (2013), the shortcomings of the current transportation systems can be presented in the following way.

When a customer releases goods to a transporter, she also releases the control of goods during the transportation process. The transporter releases tracking information about the transportation process very scarcely. Indeed, the only two relevant metrics that currently have an impact on customer satisfaction are reliability and timeliness of delivery. The absence of in-transit services causes some businesses that are prone to disruptions to be more dependent on multiple warehouses in different locations.

Arnäs, Holmström and Kalantari (2013) propose the model of hybrid shipment control to increase transportation efficiency and quality of customer service of transportation firms. The model is a mix of direct and hub and spoke logistics, combined with smart goods. Transporters can offer their customers in-transit services, which creates a platform on which hybrid shipment control can be utilized to enhance transportation operations. In-transit services include, for instance, the possibility of delaying, redirecting or combining shipments.

What is needed to create a transportations platform? A simple map-based application such as an "Uber-like platform" that (a) openly tracks and shares data on the size and weight of the product and package as well as the location of each pick and delivery event with all platform participants and (b) features integrated transaction management (picking, packing, shipping), traceability and conditions of transportation data.

"Uber-like cars" would have access to real-time demand data and are therefore able to see when products are available for pick-up from any other participant in need of transportation – whether it is active in the primary, food manufacturing or retail sector. A prerequisite for such a platform is an agreement on the governance model for product information to cover the transportation management content. In later development stages of the platform, product transportation could be integrated into systems and assets originally built for the transportation of humans (passenger airlines, passenger railways, cruise lines, crowdsourced transportation).

Stage 2: Creation of the inbound and outbound warehousing platform

Akin to logistics, inventory management (inbound and outbound warehousing) of the goods is seldom considered a core competence of any primary sector or food manufacture company. Retail companies, on the opposite, typically master these competencies in contemporary food supply chains. Our research indicates that the companies in the primary sector and food manufacturing are willing to consider taking over inventory management tasks and the respective

assets of their own product portfolio in exchange for the direct access to customer demand such as the Amazon marketplace[13].

What is then required to be able to plan and manage the inventories of a complete product portfolio and to have the visibility to all inventories in every stage of the transportation chain? A simple inventory management application that leverages shared operational data – e.g., demand visibility, inventory status and level, inventory replacement management, inventory fill rate, transaction management (picking packing, shipping) as well as traceability and conditions for storage.

Because the (shelf) space in most retail operations is extremely limited and it takes a long time for the primary sector and the food manufacturers to get a new product to the market, initially this complementary warehousing channel could serve as a platform for those products that do not make it through retail's scrutiny and onto its shelves for one reason or another. Later, this complementary warehousing platform could grow into a full-fledged substitute for the existing mode of operation. A prerequisite for such an inbound and outbound warehousing platform would be to agree on a governance model for product categories, product information and inventory management. To take this concept even further, inventories could be managed and owned by the primary sector and food manufacturers until the products are consumed from the inventory by consumers.

Stage 3: Creation of the markets platform

During the last ten years we have witnessed a transition by e-commerce companies from an "Amazon as a Retail" model – where the retailer first negotiates a wholesale price for a suppliers' product, and then purchases, merchandises and resells it on the retailers' own website – to an "Amazon as a Marketplace" model – where the marketplace operator makes it possible for anyone to sell products and services directly to the end-user or online customer. In this model, the suppliers themselves – not the retailer – set the prices for the products they sell in the marketplace.

This new type of a markets platform would enable companies to

1. market and sell the companies' complete product portfolio directly to the markets,
2. set and test prices and pricing strategies for their products,
3. introduce new product innovations without delay and third-party approval to the markets.

A markets platform leverages shared market applications, supply information data management applications and self-billing applications specific to the platform to be able to minimize the transaction costs between consumers and primary sector but also between consumers and the food manufacturer. For the model to work, an agreement on a governance model for these information types needs to be agreed on. Market platforms provide direct and general benefits: it lowers the unit costs associated with current innovation and commercialization processes as well as with space management in warehousing and distribution but also provides all the participants with a direct access to market information and end customer requirements.

[13] "Amazon Retail vs. Amazon Marketplace: What's the difference?" http://www.spscommerce.com/blog/amazon-marketplace-retail-difference-spsa/ (information retrieved August 28, 2017).

Stage 4: Algorithmic development and evolution of the transportation, warehousing, and markets platforms

It is all interconnected – platforms, big data (including co-data), algorithms, machine learning, and artificial intelligence. As we have argued, exploiting these models and technologies for increasing operational efficiencies across the organizational boundaries of the company requires the willingness to share company data over proprietary or shared platforms. Moreover, to fuse individual company systems into algorithmic development and evolution a shared method of communication is required that all systems can effectively understand. In the best circumstances, the algorithms enrich and enable a new type of optimization and organization of functions; e.g., they perform calculations, data processing and automated reasoning tasks on an industry level.

A prerequisite for the algorithmic development and evolution is that companies agree on the structure of the data, interfaces for sharing the data and governance model for maintaining the data through the development and the evolution of platforms. Based on the earlier research in data sharing, API (application programming interface) economy, and ACI (application contracting interface[14]), the benefits can be listed as follows:

1. API and ACI use improves further with increasing data intensity passing across the API or controlling the process through an ACI,
2. internal and external (shared between the industrial partners) APIs predict increases in sales more strongly than B2C APIs, and
3. API and ACI use also predicts decreases in operating costs in some specifications.

Moreover, sharing data through different platforms leads to more extensive and shared customer understanding. These new mass data serve as a glue for algorithmic development of the platform.

Next, we discuss the openness of the platform.

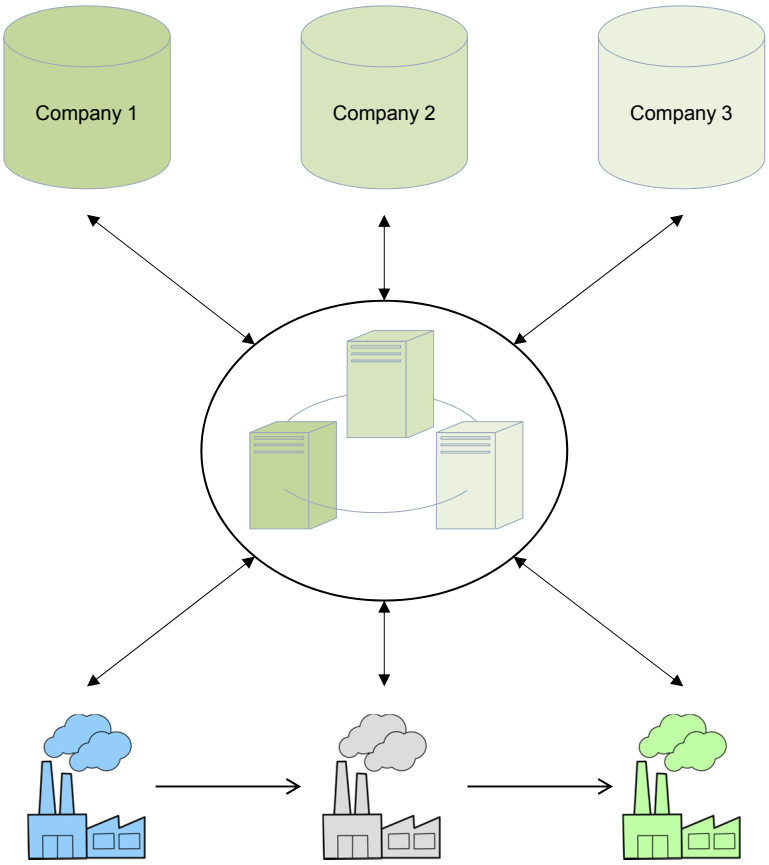
7.3 Implications of openness on future platforms – The long term

Platforms are typically thought of as either proprietary, shared or open networks and ecosystems. Platforms also encompass distinct types of markets sides. Each type of a market side can be similarly defined as being either closed, shared or open. Nonetheless, fully open platforms are very rare. In fact, Linux can be considered to be the one and only widely popular open platform.

Sharing and openness of the platform means that the participation in a platform's operations is being encouraged with different types of boundary resources (see Chapter 3). This is to lower the entry barriers for new platform participants from each side of the market (i.e., developers, customers, etc.). The provided boundary resources for proprietary, shared and open industry platforms can be very different for each type. Furthermore, it is important to understand what other decisions, e.g., financing the research and development and the maintenance of an open platform, and solving the free rider problem – beyond those regarding boundary resources alone – are needed for motivating direct and indirect network effects in such multi-sided industrial markets.

[14] For more information see Lauslahti et al., 2016.

Figure 7.1 Decentralized platform control structure



Source: Mattila, Seppälä & Holmström (2016).

Selecting an optimal level of sharing and openness for decentralized architecture is industry dependent. Furthermore, the optimum level of sharing and openness is dependent on the willingness of the platform actors – what type of the operational data they are willing to share. See Figure 7.1 for an illustration of a shared (decentralized) platform. Additionally, what comes to the future of the platforms, interoperating with other industrial platforms, will also be vital and needs to be strategically addressed.

Sharing and openness of data, specifically, in industrial platforms need to be considered from three perspectives:

1. what are the company's proprietary data types? That is, what data are relevant to companies' core business and used only internally within the company firewall?

The other two perspectives are more related to the data that can leave the companies' firewall.

2. what data types can be shared with other trusted industrial actors?
3. what data types can be shared with any actor of the society at large?

Next, we consider a long-term roadmap to industrial platform.

Stage 5: Cross-industry interoperability of transportation, warehousing and market platforms

Cross-industry interoperability exists when organizations or industrial supply chains from different industries are able to interact without friction in data, products and/or services exchange to achieve their own or common industrial goals. Generally, interoperability has been understood as a method for structurally separate ICT systems to work together.

Cross-industry interoperability is still largely an ideal. The current company, industry, and cross-industry systems are disconnected from one another, as they have been designed for each company's proprietary purposes piece by piece, layer by layer. They have emerged like isolated, individual pockets of life in biological ecosystems, slowly evolving into separate species that are no longer able to interconnect.

Cross-industry interoperability is relevant because the industry may wish to enable cross-industrial platform transactions between different market sides. Furthermore, it is important to recognize that these transactions are allowed through multi-level compatibilities of social, technical and operational boundary resources. To fuse such developments, a shared method of communication is required that all systems can effectively understand, so essentially, to build a platform, we first need to build boundary resources for it, e.g., defining different standard data types and interfaces for the interoperability. Additionally, the appeal of interoperability to a decentralized industry platform will depend mostly on the power of network effects, i.e., the size of the market opportunity to each market side and market participant.

Stage 6: Interoperability with established competitors in transportation, warehousing and market platforms

Interoperability between *competitors* typically leads to a situation in which *all platforms* – competing or complementary – benefit from the larger total number of platform users on these platforms as the positive network effects grow respectively. To illustrate Google Maps, Microsoft Office applications work in every platform thought their cloud infrastructure. To facilitate the interoperability between otherwise independent platforms, a shared method of free communication is required that all industrial platforms can effectively understand.

However, when push comes to shove and it is time to take the initiative, willing pioneers seem to be non-existent. So far, no party has considered it their responsibility to take up the role of a platform mediator at such a high level of integration. Real-world examples are still non-existent. Over time, this may become a problem because, without a suitable platform for a system of systems and ubiquitous network of systems[15], we are severely under-utilizing our assets as a society.

Who will be the first mover? Is it a market-driven company that eventually steps up to the plate and assumes the role of a platform mediator? Could it be that the government takes a position as an enabling force and that, by regulating and/or deregulating the field, it encourages market-driven operators to take the helm on platform development? Maybe it is the government itself that will take up the role of a platform mediator.

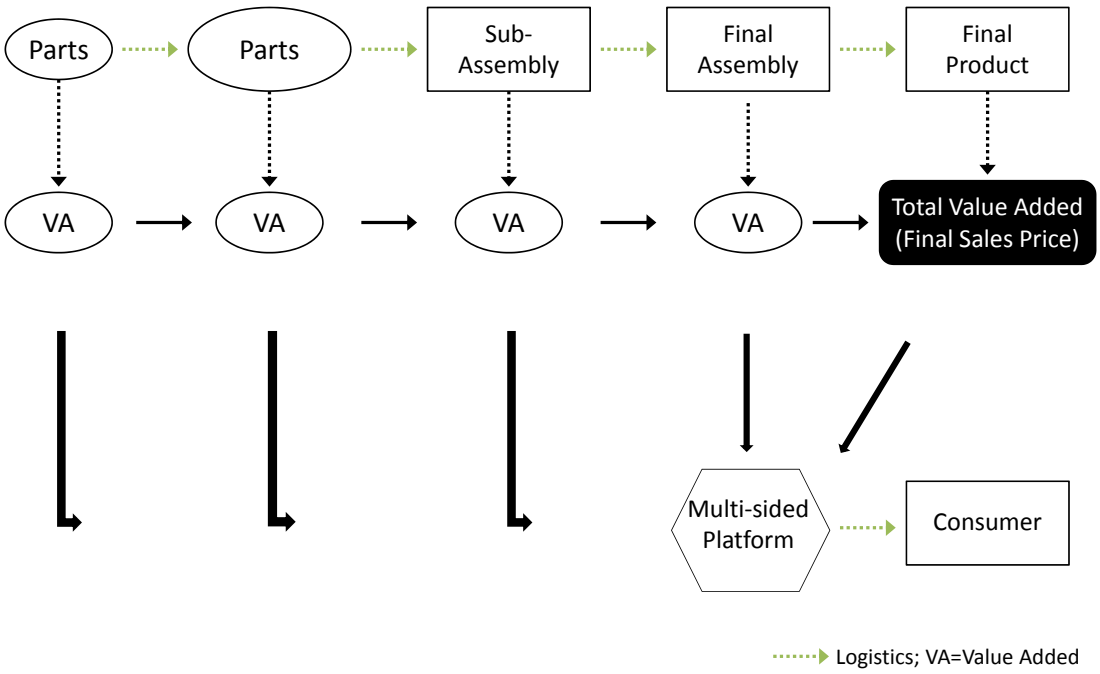
[15] For more information on ubiquitous networks of systems, see Seppälä & Mattila (2016).

8 Effects of industrial Platforms on Value Chains

Multi-sided market structures are transforming contemporary industrial supply chains across many industries (see Figure 9.1). As multi-sided market structures relocate operational tasks and activities across organizational boundaries, a key challenge relates to the act of redistributing and balancing the value added, i.e., cost of inputs, investments and profits.

On the one hand, companies can create value through insourcing disaggregated task and activities, including but not limited to product category, inventory and sales management, across the companies participating these multi-sided market structures. On the other hand, companies could also drive commoditization of transportation and other similar operational tasks and activities that are not core business and core resources for any company by sharing data between industrial partners.

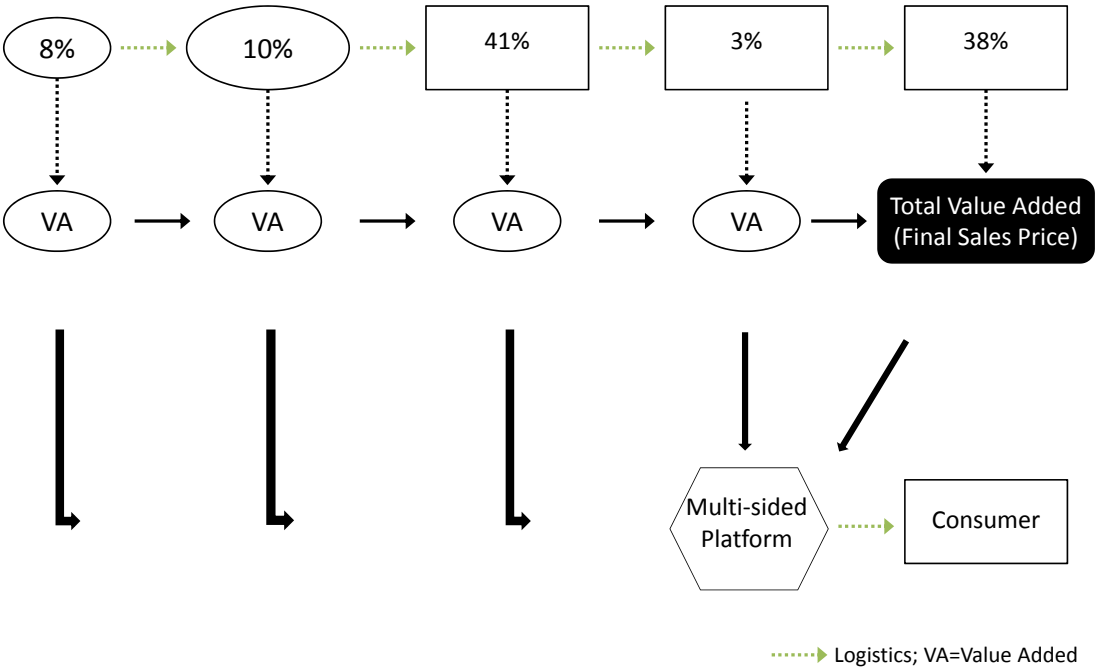
Figure 9.1 Impact of multi-sided platforms on conventional value chains



These new multi-sided market structures set a question of how will the value of each supply chain participant be restructured after the emergence of a multi-sided markets platform in the food industry value chain. The evidence, from the other industries, has shown that these multi-sided market structures challenge and change the contemporary role of retailers in particular. According to the study (for more information, see Ali-Yrkkö, 2014), retailers capture, on average, 38 % of the final sales price (vat 0 %) of food products (see Figure 9.2 and Figure 2.3, page 13). Is this the amount of value added, i.e., cost of inputs, investments and profits that will be redistributed and balanced if a new multi-sided market structure emerges?

Our study seeks to contribute to this stream of research by exploring companies and industrial supply chains' ability to extend their business access through a multi-sided market structure.

Figure 9.2 Share of total value added of individual sectors in the Finnish food chain



However, the great question remains – who will take the initiative of building these platforms, 1) the primary sector, 2) food manufacturers, 3) retail or 4) an emerging new players and/or existing e-commerce giants?

Who builds such multi-sided marketplaces, e.g., a show room for the digitization and sales of products and services, i.e., 1) all actors separately, 2) all actors joining existing platforms, 3) all actors together establishing a platform and/or 4) the resellers enabling such market access and providing the necessary tools for implementation? Furthermore, it needs to be understood that these ways for organizing a platform are not necessarily substitute modes of operation but rather are complementary modes of operations.

8.1 General benefits of transitioning to a platform model

Platform ecosystem(s) will renew the market environment in the Finnish grocery business and will affect incumbent players in one way or another. The current supply chain needs to be boosted in terms of efficiency and its capability to meet highly fragmented market micro-segments, while preparing to meet ever more individualistic consumer needs soon. Changes are dependent on incumbents' proactive actions toward a new market environment empowered by digital platform models. Incumbents still have an advantage and opportunity to renew the market environment and maintain an important role as part of the supply chain from agriculture to the end customer.

If incumbents will choose to defend the current status quo, experience from other industries tells us that cross-industrial platforms have indeed displaced legacy players to take on the role of a market place. The threat to incumbents will be to become replaced by a new player from

another industrial area, some innovative incumbent or group of incumbents. Threats do not knock on the door in the form of giant incumbents alone. Technological development has made it possible for companies established from one's garage to have equal opportunities to change global markets – they just need to play with new rules. The question is whether incumbents are able to utilize external resources or whether they will be replaced by them.

The six-stage scenario presented above will affect current players in the market and open new opportunities for emerging businesses. The six stages represent a step-by-step approach to prepare for the evident future one strategic move at a time, avoiding the pitfalls of sudden and radical paradigm shifts in a risky and disruptive one-time effort. This chapter describes the roles that each stakeholder group could enact in each of the six stages. Based on our analysis, we have identified three stakeholder groups that are categorized based on their current position in the food chain in Finland:

1. the primary sector,
2. the food manufacturing sector and
3. the retail sector.

It is expected that implementing *Stage 1: Transportations Platform – Creation of available to pick & deliver and return & deliver platform*, would **increase the number of delivery channels** to reach consumers directly from the food manufacturing and primary production sectors' point of views. Simultaneously, it would **make it possible to deliver smaller batches** from the primary sector and food manufacturing to nearby locations (e.g., retail stores) or directly to end users and, thereby, **decrease need for logistics through central warehouses**. It would also **decrease the importance of physical retail stores as distributors** of physical products.

The implementation of *Stage 2: Creation of the inbound and outbound warehousing platform* could **provide retailers with better visibility and easier access to product portfolios** of food manufacturing partners and the primary sector. In addition, this could give an opportunity for retailers to act in a platform-like environment and offer shelf space where food manufacturing companies and the primary sector could self-handle their respective category management and pricing strategies independently. This would entail **a shift to a charge-per-transaction model** – a popular variant of the commission model – where the retailer charges a fixed, agreed-upon fee for every transaction conducted through its shelves. **This would significantly decrease inventory risks**. It would further provide for more innovative and fragmented product offerings as small producers gain access to the shelf space of national retailers.

Stage 3: Creation of the markets platform would free retailers' resources from activities such as category management and pricing as well as decrease the need for having their own inventory when simultaneously making it possible to enlarge the number of products on sale: the platform would enable access for new (innovative) products and players to market. An open platform with open access would **give the power of decision about the scope of offered products to consumers** (type of a product, how and where it is produced, market price, etc.). The model enhances consumer centricity in the governance of the food chain because the foremost driver of sales is not the retailers' history data–driven category management anymore but the set of product characteristics that meets the real-time needs of consumers best. **The consumer drives category management and production**. To food manufacturers and primary sector actors, the model would give a new channel to market and the ability to handle category man-

agement and pricing activities based on real consumption. There would be the possibility for **new channel(s) and new players** to offer **last mile delivery** options.

When all three operational platforms (transportation, warehousing, and markets) would be united under the principles of *Stage 4: Algorithmic development and evolution of the platform* – it is expected that the current roles of the key players in the market would start blurring and, depending on the materialized level of openness, new players would have a chance to enter the market. Niche strategies would become increasingly more relevant, as transaction costs will be mitigated through digitally optimized and managed logistics and serving small customer segments would become profitable. This would attract new, highly specialized players who would specialize in narrow core area(s) and target consumer needs that have not been served before.

Stage 5: Cross industry interoperability of transportation, warehousing and market platforms would bring more openness. Increased openness would enable new innovations across the board, driven by access to data that are openly shared about consumers, logistics, and all other activities on the platform. New players would have a chance to utilize data and other assets incumbents would offer, and meanwhile, incumbents would benefit from the flexibility and agility of smaller players.

Open co-operation between incumbents and startups would make it easier for startups to make market relevant products and services, but it also would lower the hurdles to accessing the market in the first place. Meanwhile, incumbents can increase the number of innovators and reduce risks related to failed innovations by utilizing start-ups by monetizing, partnering with and acquiring the ones that are relevant for business.

Stage 6: Interoperability with established competitors in transportation, warehousing and market platforms would enable a fully open and interoperable platform and create the "perfect market" – from an end user's point of view – where the best products and services would be available and new players would have easy access to market.

All six stages will have a major impact on status quo of the current market organization within the food chain. As presented in this report, some of the incumbents are more willing to change their ways of doing business than others. Understanding and exploiting achievements in technological development and harnessing for new business development will be a challenge for incumbents seeking solutions because the entrenched competitive dynamics of the current food chain make bold moves very risky and difficult. Incumbents also need to be able to build up competencies to be able to adapt to global market disruptions. It is easier for new entrants to play with the new rules, but it should be easier for incumbents to build on their current market position by following the presented six stages.

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